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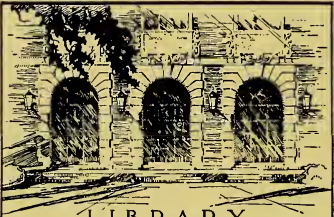

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REMOTE STORAGE

ALTGELD HALL STACKS

REPORT

OF THE

TESTS OF METALS

AND

OTHER MATERIALS

FOR

INDUSTRIAL PURPOSES

MADE WITH THE

UNITED STATES TESTING MACHINE AT WATERTOWN ARSENAL,
MASSACHUSETTS,

DURING

THE FISCAL YEAR ENDED JUNE 30, 1889.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
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REMOTE STORAGE

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

With a letter from the Chief of Ordnance, a report of "Tests of iron and steel, and other materials for industrial purposes," made at Watertown Arsenal, during the fiscal year ended June 30, 1889.

DECEMBER 9, 1889.—Referred to the Committee on Manufactures and ordered to be printed.

WAR DEPARTMENT,
Washington City, December 3, 1889.

The Secretary of War has the honor to transmit to the House of Representatives, in compliance with the act of March 3, 1885 (23 Stat., 502), a letter from the Chief of Ordnance, dated the 20th ultimo, and its accompanying report of Lieut. Col. F. H. Parker, Ordnance Corps, U. S. Army, commanding the Watertown Arsenal, of "Tests of iron and steel and other materials for industrial purposes," made with the United States testing machine, during the fiscal year ended June 30, 1889.

REDFIELD PROCTOR,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

ORDNANCE OFFICE, WAR DEPARTMENT,
Washington, D. C., November 20, 1889.

SIR: I have the honor to submit, for transmission to Congress, as required by law, the report of Lieut. Col. F. H. Parker, Ordnance Department, commanding Watertown Arsenal, of "Tests of iron, steel, and other materials for industrial purposes," made with the United States testing machine, during the fiscal year ended June 30, 1889.

Very respectfully,

S. V. BENÉT,
Brig. Gen., Chief of Ordnance.

The SECRETARY OF WAR.

WATERTOWN ARSENAL,
Watertown, Mass., August 31, 1889.

SIR: I have the honor to transmit, herewith, the annual report of tests of iron, steel, and other materials made at this arsenal with the United States testing machine, during the fiscal year ending June 30, 1889:

The total number of specimens tested was 2,075, of which 1,247 were public tests and 828 for private parties.

The receipts and expenditures for the year were as follows:

Testing machine, 1889.

Amount appropriated	$10,000.00
Amount received for private tests	997.10
Total received	10,997.10
Expended for services and labor	8,354.87
Expended for light, power, tools, implements, and for materials for repairs and tests	2,217.13
Deposited to credit of the Treasurer of the United States	425.10
Total disbursed	$10,997.10

Very respectfully, your obedient servant,

F. H. PARKER,
Lieut. Col. Ord. Dept., U. S. A., Commanding.

The CHEIF OF ORDNANCE, U. S. ARMY,
Washington, D. C.

REPORT

OF

TESTS ON THE STRENGTH OF STRUCTURAL MATERIAL

MADE AT THE

WATERTOWN ARSENAL, MASSACHUSETTS,

ON THE

400 TONS TESTING MACHINE,

DURING THE

FISCAL YEAR ENDING JUNE 30, 1889.

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3.2-INCH STEEL B. L. RIFLES.

SPECIMENS FROM TUBES AND JACKETS.

SPECIMENS FROM TUBES.

No. 3692.

Marks, $\overset{32\ R_{43}\ T}{B\ T_9\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	0.	....	
3,000	15,000	.000400	.000150	0.	....	
4,000	20,000	.000550	.000150	0.	....	
5,000	25,000	.000700	.000150	0.	....	
6,000	30,000	.000850	.000150	0.	....	
7,000	35,000	.001050	.000200	0.	....	
8,000	40,000	.001200	.000150	0.	....	
9,000	45,000	.001350	.000150	....	....	
9,200	46,000	.001350	0.	....	....	
9,400	47,000	.001400	.000050	....	....	Elastic limit.
9,600	48,000	.002350	.000950	....	....	
9,800	49,000	.003100	.000750	....	....	
10,000	50,000	.006400	.003300	....	....	
10,400	52,000	.007850	.001450	....	....	
10,800	54,000	.009750	.001900	....	....	
11,200	56,000	.011400	.001650	....	....	
11,600	58,000	.013300	.001900	....	....	
12,000	60,000	.016100	.002800	....	....	
12,400	62,000	.019100	.003000	....	....	
12,800	64,000	.020600	.001500	....	....	
13,200	66,000	.023250	.002650	....	....	
13,600	68,000	.026100	.002850	....	....	
14,000	70,000	.029600	.003500	....	....	
14,400	72,000	.032500	.002900	....	....	
14,800	74,000	.037400	.004900	....	....	
15,200	76,000	.041750	.004350	....	....	
15,600	78,000	.045600	.003850	....	....	
16,000	80,000	.052500	.006900	....	....	
16,400	82,000	.0600	.0075	....	....	
16,800	84,000	.0750	.0150	....	....	
17,200	86,000	.1000	.0250	....	....	
17,640	88,200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,200
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	0.2150
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per centum of original section		46.2
Position of rupture		″.60 from neck.
Character of broken surface		silky.
Elongation of inch sections		″.13, ″.30*

No. 3693.

Marks, $\begin{matrix}32\ R_{43}\ T\\ B\ T_{10}\ M\end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	0.	....	
3,000	15,000	.000500	.000200	0.	....	
4,000	20,000	.000600	.000100	0.	....	
5,000	25,000	.000800	.000200	0.	....	
6,000	30,000	.000950	.000150	0.	....	
7,000	35,000	.001100	.000150	0.	....	
8,000	40,000	.001250	.000150	0.	....	
9,000	45,000	.001450	.000200	....	....	
9,200	46,000	.001500	.000050	....	....	
9,400	47,000	.001550	.000050	....	....	Elastic limit.
9,600	48,000	.004100	.002550	....	....	
9,800	49,000	.006500	.002400	....	....	
10,000	50,000	.007250	.000750	....	....	
10,400	52,000	.009550	.002300	....	....	
10,800	54,000	.001110	.001550	....	....	
11,200	56,000	.013550	.002450	....	....	
11,600	58,000	.015550	.002000	....	....	
12,000	60,000	.018100	.002550	....	....	
12,400	62,000	.020000	.001900	....	....	
12,800	64,000	.022400	.002400	....	....	
13,200	66,000	.025350	.002950	....	....	
13,600	68,000	.028250	.002900	....	....	
14,000	70,000	.032000	.003750	....	....	
14,400	72,000	.036000	.004000	....	....	
14,800	74,000	.040650	.004650	....	....	
15,200	76,000	.046000	.005350	....	....	
15,600	78,000	.0525	.0065	....	....	
16,000	80,000	.0620	.0095	....	....	
16,400	82,000	.0750	.0130	....	....	
16,800	84,000	.0950	.0200	....	....	
17,090	85,450	.1200	.0250	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	85,450
Elastic limit per square inch of original section	do	47,000
Elongation per inch after rupture	inch	0.2600
Elongation per inch under strain at elastic limit	do	.001550
Reduction in diameter at point of rupture	do	.135
Reduction in area after rupture, per centum of original section		46.2
Position of rupture		″.80 from neck
Character of broken surface		silky
Elongation of inch sections		″.17, ″.35*

No. 3694.

Marks, $\genfrac{}{}{0pt}{}{32\ R_{43}\ T}{M\ T_9\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	0.	....	
3,000	15,000	.000400	.000150	0.	....	
4,000	20,000	.000550	.000150	0.	....	
5,000	25,000	.000700	.000150	0.	....	
6,000	30,000	.000850	.000150	0.	....	
7,000	35,000	.001050	.000200	0.	....	
8,000	40,000	.001200	.000150	0.	....	
9,000	45,000	.001350	.000150	....	....	
9,200	46,000	.001350	0.	....	....	
9,400	47,000	.601400	.000050	....	....	
9,600	48,000	.001450	.000050	....	....	Elastic limit.
9,800	49,000	.001800	.000350	....	....	
10,000	50,000	.003750	.001950	....	....	
10,400	52,000	.005600	.002050	....	....	
10,800	54,000	.007500	.001900	....	....	
11,200	56,000	.009250	.001750	....	....	
11,600	58,000	.011250	.002000	....	....	
12,000	60,000	.013050	.001800	....	....	
12,400	62,000	.015000	.001950	....	....	
12,800	64,000	.017250	.002250	....	....	
13,200	66,000	.019750	.002500	....	....	
13,600	68,000	.022150	.002400	....	....	
14,000	70,000	.025000	.002850	....	....	
14,400	72,000	.028000	.003000	....	....	
14,800	74,000	.031000	.003000	....	....	
15,200	76,000	.034650	.003650	....	....	
15,600	78,000	.038750	.004100	....	....	
16,000	80,000	.044150	.005400	....	....	
16,400	82,000	.049900	.005750	....	....	
16,800	84,000	.058750	.008550	....	....	
17,200	86,000	.0700	.011250	....	....	
17,600	88,000	.0850	.0150	....	....	
17,960	89,800	.1300	.0450	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,800
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	0.2050
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per centum of original section		46.2
Position of rupture		″.50 from neck
Character of broken surface		silky
Elongation of inch sections		″.11, ″.30

No. 3695.

Marks, $\begin{smallmatrix}32 & R_{43} & T\\ M & T_{10} & M\end{smallmatrix}$
Diameter, ″.505.
Sectional area, .20 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000250	.000150	0.	....	
3, 000	15, 000	.000450	.000200	0.	....	
4, 000	20, 000	.000600	.000150	0.	....	
5, 000	25, 000	.000800	.000200	0.	....	
6, 000	30, 000	.001000	.000200	0.	....	
7, 000	35, 000	.001100	.000100	0.	....	
8, 000	40, 000	.001250	.000150	0.	....	
9, 000	45, 000	.001400	.000150	....	....	
9, 200	46, 000	.001450	.000050	....	....	
9, 400	47, 000	.001550	.000100	....	....	Elastic limit.
9, 600	48, 000	.001900	.000350	....	....	
9, 800	49, 000	.005600	.003700	....	....	
10, 000	50, 000	.006250	.000650	....	....	
10, 400	52, 000	.007750	.001500	....	....	
10, 800	54, 000	.009500	.001750	....	....	
11, 200	56, 000	.011500	.002000	....	....	
11, 600	58, 000	.013500	.002000	....	....	
12, 000	60, 000	.015250	.001750	....	....	
12, 400	62, 000	.017250	.002000	....	....	
12, 800	64, 000	.019400	.002150	....	....	
13, 200	66, 000	.021900	.002500	....	....	
13, 600	68, 000	.024250	.002350	....	....	
14, 000	70, 000	.027750	.003500	....	....	
14, 400	72, 000	.030350	.002600	....	....	
14, 800	74, 000	.034000	.003650	....	....	
15, 200	76, 000	.038000	.004000	....	....	
15, 600	78, 000	.042250	.004250	....	....	
16, 000	80, 000	.047250	.005000	....	....	
16, 400	82, 000	.054000	.006750	....	....	
16, 800	84, 000	.064250	.010250	....	....	
17, 200	86, 000	.0750	.010750	....	....	
17, 600	88, 000	.1000	.0250	....	....	
17, 730	88, 650	.1350	.0350	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,650
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	0.2100
Elongation per inch under strain at elastic limit	do...	.001560
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per centum of original section		49.1
Position of rupture		1″.15 from neck
Character of broken surface		silky
Elongation of inch sections		″.16, .″26*

No. 3784.

Marks, $\substack{32\ R_{57}\ T \\ B\ T_3\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000550	.000250	....	....	
6, 000	30, 000	.000850	.000300	....	....	
7, 000	35, 000	.001050	.000200	0.	....	
8, 000	40, 000	.001300	.000250	....	....	
8, 400	42, 000	.001350	.000050	0.	....	
8, 600	43, 000	.001450	.000100	....	....	
8, 800	44, 000	.001550	.000100	....	....	Elastic limit.
9, 000	45, 000	.002500	.000950	....	....	
9, 200	46, 000	.004000	.001500	....	....	
9, 400	47, 000	.005400	.001400	....	....	
9, 800	49, 000	.007000	.001600	....	....	
10, 200	51, 000	.008850	.001850	....	....	
10, 600	53, 000	.010600	.001750	....	....	
11, 000	55, 000	.012550	.001950	....	....	
11, 400	57, 000	.014750	.002200	....	....	
17, 040	85, 200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	85, 200
Elastic limit per square inch of original section........do...	44, 000
Elongation per inch after rupture........inch..	0. 2000
Elongation per inch under strain at elastic limit........do...	.001550
Reduction in diameter at point of rupture ....do...	.105
Reduction in area after rupture, per centum of original section	37. 1
Position of rupture	″. 50 from the neck
Character of broken surface........	Silky
Elongation of inch sections........	″. 30,*″. 10

No. 3785.

Marks, $\genfrac{}{}{0pt}{}{32\ R_{57}\ T}{B\ T_4\ M}$

Diameter, ″.505.

Sectional area, .20 square inch.

Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000450	.000150	....	....	
6,000	30,000	.000850	.000400	....	....	
7,000	35,000	.001000	.000150	—.000050	—.000050	
8,000	40,000	.001200	.000200	....	....	
8,400	42,000	.001350	.000150	0.	.000050	
8,600	43,000	.001400	.000050	....	....	
8,800	44,000	.001500	.000100	....	....	
9,000	45,000	.001550	.000050	....	....	Elastic limit.
9,200	46,000	.001850	.000300	....	....	
9,400	47,000	.002200	.000350	....	....	
9,600	48,000	.002900	.000700	....	....	
10,000	50,000	.006000	.003100	....	....	
10,400	52,000	.008250	.002250	....	....	
10,800	54,000	.010000	.001750	....	....	
11,200	56,000	.011850	.001850	....	....	
11,600	58,000	.014500	.002650	....	....	
17,470	87,350	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,350
Elastic limit per square inch of original section	do...	45.000
Elongation per inch after rupture	inch..	.2050
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per centum of original section		34.0
Position of rupture		″-40 from the neck
Character of broken surface		silky, serrated; trace of granulation
Elongation of inch sections		″.15, ″.26*

No. 3786.

Marks, $\overset{32\ R^{57}\ T}{M\ T^{3}\ M}$
Diameter ".505.
Sectional area, .20 square inch.
Gauged length 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000300	.000150	....	....	
4,000	20,000	.000550	.000250	....	....	
6,000	30,000	.000900	.000359	....	....	
7,000	35,000	.001100	.000200	0.	....	
8,000	40,000	.001300	.000200	....	....	
8,400	42,000	.001350	.000050	0.	....	
8,600	43,000	.001400	.000050	....	....	
8,800	44,000	.001450	.000050	....	....	
9,000	45,000	.001500	.000050	....	....	
9,200	46,000	.001550	.000050	....	....	
9,400	47,000	.001600	.000050	....	....	
9,600	48,000	.001650	.000050	....	....	Elastic limit.
9,800	49,000	.003400	.001750	....	....	
10,000	50,000	.006400	.003000	....	....	
10,200	51,000	.007100	.000700	....	....	
10,600	53,000	.009250	.002150	....	....	
11,000	55,000	.011400	.002150	....	....	
11,400	57,000	.013600	.002200	....	....	
11,800	59,000	.015750	.002150	....	....	
12,200	61,000	.018250	.002500	....	....	
16,810	84,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	84,050
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	0.1550
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per centum of original section		23.9
Position of rupture		".60 from the neck
Character of broken surface		silky, serrated
Elongation of inch sections		".21*, ".10

No. 3787.

Marks, $^{32\ R_{57}\ T}_{M\ T_4\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000300	.000150	....	....	
4,000	20,000	.000700	.000400	....	....	
6,000	30,000	.000950	.000250	....	....	
7,000	35,000	.001150	.000200	0.	....	
8,000	40,000	.001350	.000200	....	....	
8,400	42,000	.001400	.000050	0.	....	
8,600	43,000	.001450	.000050	....	....	Elastic limit.
8,800	44,000	.001600	.000150	....	....	
9,000	45,000	.001750	.000150	....	....	
9,200	46,000	.002000	.000250	....	....	
9,600	48,000	.004750	.002750	....	....	
10,000	50,000	.006650	.001900	....	....	
10,400	52,000	.008750	.002100	....	....	
10,800	54,000	.010750	.002000	....	....	
11,200	56,000	.012650	.001900	....	....	
17,020	85,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	85,100
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	″.105
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		1″.10 from the neck
Character of broken surface		silky; serrated. Opened cracks in surface of stem
Elongation of inch sections		″.27*, ″.21

No. 3778.

Marks, $\overset{32\ R_{61}\ T}{B\ T_3\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000550	.000250	....	....	
6,000	30,000	.000900	.000350	....	....	
7,000	35,000	.001100	.000200	0.	....	
8,000	40,000	.001350	.000250	....	....	
8,400	42,000	.001400	.000050	0.	....	
8,600	43,000	.001450	.000050	....	....	Elastic limit.
8,800	44,000	.001800	.000350	....	....	
9,000	45,000	.002050	.000250	....	....	
9,200	46,000	.003300	.001250	....	....	
9,600	48,000	.006500	.003200	....	....	
10,000	50,000	.008500	.002000	....	....	
10,400	52,000	.011000	.002500	....	....	
10,800	54,000	.013000	.002000	....	....	
11,200	56,000	.015250	.002250	....	....	
16,580	82,900	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	82,900
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	0.2400
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per centum of original section		49.1
Position of rupture		″.60 from the neck
Character of broken surface		silky
Elongation of inch sections		″.34*, ″.14

No. 3779.

Marks, $\begin{matrix}32 & R_{61} & T\\ B & T_4 & M\end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000550	.000250	....	....	
6,000	30,000	.000900	.000350	....	....	
7,000	35,000	.001150	.000250	0.	....	
8,000	40,000	.001350	.000200	....	....	
8,400	42,000	.001450	.000100	.000050	.000050	
8,600	43,000	.001550	.000100	....	....	
8,800	44,000	.001600	.000050	....	....	Elastic limit.
9,000	45,000	.002350	.000750	....	....	
9,200	46,000	.004250	.001900	....	....	
9,400	47,000	.006400	.002150	....	....	
9,800	49,000	.007850	.001450	....	....	
10,200	51,000	.009850	.002000	....	....	
10,600	53,000	.012000	.002150	....	....	
11,000	55,000	.014300	.002300	....	....	
11,400	57,000	.016500	.002200	....	....	
16,510	82,550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds..	82,550
Elastic limit per square inch of original section..........do...	44,000
Elongation per inch after rupture..........inch..	0.2450
Elongation per inch under strain at elastic limit..........do...	.001600
Reduction in diameter at point of rupture..........do...	.125
Reduction in area after rupture, per centum of original section..........	43.3
Position of rupture..........	1″ from the neck
Character of broken surface..........	silky
Elongation of inch sections..........	″.32*, ″.17

No. 3780.

Marks, $^{32\ \mathrm{R}_{61}\ \mathrm{T}}_{\mathrm{M}\ \mathrm{T}_3\ \mathrm{M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
4,000	20,000	.000500	.000250	....	....	
6,000	30,000	.000800	.000300	....	....	
7,000	35,000	.000950	.000150	0.	....	
8,000	40,000	.001250	.000300	0.	....	
8,400	42,000	.001350	.000100	....	....	Elastic limit.
8,600	43,000	.001850	.000500	....	....	
8,800	44,000	.002750	.000900	....	....	
9,000	45,000	.005000	.002250	....	....	
9,400	47,000	.007000	.002000	....	....	
9,800	49,000	.008900	.001900	....	....	
10,200	51,000	.011000	.002100	....	....	
10,600	53,000	.013000	.002000	....	....	
11,000	55,000	.015350	.002350	....	....	
16,240	81,200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81,200
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	0.1900
Elongation per inch under strain at elastic limit	do...	.001350
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per centum of original section		40.3
Position of rupture		″.60 from the neck.
Character of broken surface		silky
Elongation of inch sections		″.29*, ″.19

No. 3781.

Marks, $\begin{matrix}32 & R_{61} & T\\ M & T_4 & M\end{matrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000150	.000150	0.	....	
2, 000	10, 000	.000350	.000200	....	....	
4, 000	20, 000	.000600	.000250	....	....	
6, 000	30, 000	.000950	.000350	....	....	
7, 000	35, 000	.001200	.000250	0.	....	
8, 000	40, 000	.001400	.000200	....	....	
8, 400	42, 000	.001450	.000050	.000050	.000050	
8, 600	43, 000	.001500	.000050	....	....	
8, 800	44, 000	.001550	.000050	....	....	Elastic limit.
9, 000	45, 000	.002600	.001050	....	....	
9, 200	46, 000	.004400	.001800	....	....	
9, 400	47, 000	.005650	.001250	....	....	
9, 800	49, 000	.007600	.001950	....	....	
10, 200	51, 000	.010000	.002400	....	....	
10, 600	53, 000	.012250	.002250	....	....	
11, 000	55, 000	.014350	.002100	....	....	
11, 400	57, 000	.016000	.001650	....	....	
16, 480	82, 400	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	82, 400
Elastic limit per square inch of original section ....do...	44, 000
Elongation per inch after rupture ....inch..	0. 2000
Elongation per inch under strain at elastic limit ....do...	.001550
Reduction in diameter at point of rupture ....do...	.125
Reduction in area after rupture, per centum, of original section	43. 3
Position of rupture	″.60 from the neck
Character of broken surface	silky
Elongation of inch sections	″. 30*, ″. 10

SPECIMENS FROM JACKETS.

No. 3805.

Marks, $\begin{smallmatrix}32\,R_{51}\,J\\T_1\,O\end{smallmatrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000200	.000200	0.		
2,000	10,000	.000350	.000150			
4,000	20,000	.000700	.000350			
6,000	30,000	.001000	.000300			
8,000	40,000	.001350	.000350	0.		
9,200	46,000	.001500	.000150	0.		
9,400	47,000	.001500	0.			
9,600	48,000	.001600	.000100			
9,800	49,000	.001650	.000050			
10,000	50,000	.001700	.000050			
10,200	51,000	.001700	0.			
10,400	52,000	.001750	.000050			
10,600	53,000	.001800	.000050			
10,800	54,000	.001850	.000050			
11,000	55,000	.001900	.000050			
11,200	56,000	.001950	.000050			Elastic limit.
11,400	57,000	.002300	.000350			
11,600	58,000	.002600	.000300			
11,800	59,000	.003350	.000750			
12,200	61,000	.006000	.002650			
12,600	63,000	.007900	.001900			
13,000	65,000	.009250	.001350			
13,400	67,000	.010900	.001650			
13,800	69,000	.012500	.001600			
20,790	103,950					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	103,950
Elastic limit per square inch of original section	do	56,000
Elongation per inch after rupture	inch	0.2050
Elongation per inch under strain at elastic limit	do	.001950
Reduction in diameter at point of rupture	do	.115
Reduction in area after rupture, per centum of original section		40.3
Position of rupture		1″.10 from the neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.36*

No. 3771.

Marks, $\genfrac{}{}{0pt}{}{32\,\text{R}_{53}\,\text{J}}{\text{T}_1\,\text{M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
4,000	20,000	.000650	.000400	....	....	
6,000	30,000	.001050	.000400	....	....	
8,000	40,000	.001300	.000250	.000050	.000050	
9,200	46,000	.001550	.000250	.000050	0.	
9,400	47,000	.001600	.000050	....	....	
9,600	48,000	.001600	0.	....	....	
9,800	49,000	.001650	.000050	....	....	
10,000	50,000	.001700	.000050	....	....	Elastic limit.
10,200	51,000	.001900	.000200	....	....	
10,400	52,000	.002100	.000200	....	....	
10,600	53,000	.002600	.000500	....	....	
11,000	55,000	.005000	.002400	....	....	
11,400	57,000	.007000	.002000	....	....	
11,800	59,000	.008500	.001500	....	....	
12,200	61,000	.010000	.005000	....	....	
12,600	63,000	.011700	.001700	....	....	
19,060	95,300	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	95,300
Elastic limit per square inch of original section	do	50,000
Elongation per inch after rupture	inch	0.2350
Elongation per inch under strain at elastic limit	do	.001700
Reduction in diameter at point of rupture	do	.135
Reduction in area after rupture, per centum of original section		46.2
Position of rupture		″1 from the neck
Character of broken surface		silky.
Elongation of inch sections		″.33*, ″.14

No. 3772.

Marks, $^{32\,R_{56}\,J}_{T_1\,M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2.″

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	....	
2,000	10,000	.000200	.000150	....	....	
4,000	20,000	.000500	.000300	....	....	
6,000	30,000	.000900	.000400	....	....	
8,000	40,000	.001200	.000300	0.	....	
9,200	46,000	.001450	.000250	0.	....	
9,400	47,000	.001500	.000050	....	....	
9,600	48,000	.001550	.000050	....	....	
9,800	49,000	.001600	.000050	....	....	
10,000	50,000	.001650	.000050	....	....	
10,200	51,000	.001700	.000050	....	....	Elastic limit.
10,400	52,000	.001900	.000200	....	....	
10,600	53,000	.002200	.000300	....	....	
10,800	54,000	.002400	.000200	....	....	
11,200	56,000	.004900	.002500	....	....	
11,600	58,000	.006500	.001600	....	....	
12,000	60,000	.009250	.001750	....	....	
12,400	62,000	.010500	.001250	....	....	
12,800	64,000	.011900	.001400	....	....	
19,580	97,900	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	97,900
Elastic limit per square inch of original section	do	51,000
Elongation per inch after rupture	inch	0.2300
Elongation per inch under strain at elastic limit	do	.001700
Reduction in diameter at point of rupture	do	.115
Reduction in area after rupture, per centum of original section		40.3
Position of rupture		1″ from the neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.31*

No. 3806.

Marks, $\underset{\mathrm{T,\ M}}{{}^{32}\mathrm{R}_{68}\mathrm{J}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000350	.000200	....	....	
4,000	20,000	.000650	.000300	....	....	
6,000	30,000	.001050	.000400	....	....	
8,000	40,000	.001350	.000300	.000050	.000050	
9,200	46,000	.001550	.000200	.000050	0.	
9,400	47,000	.001600	.000050	....	....	
9,600	48,000	.001650	.000050	....	....	
9,800	49,000	.001650	0.	....	....	
10,000	50,000	.001750	.000100	....	....	
10,200	51,000	.001800	.000050	....	....	
10,400	52,000	.001850	.000050	....	....	Elastic limit.
10,600	53,000	.002000	.000150	....	....	
10,800	54,000	.002500	.000500	....	....	
11,000	55,000	.003100	.000600	....	....	
11,400	57,000	.005350	.002250	....	....	
11,800	59,000	.007100	.001750	....	....	
12,200	61,000	.008900	.001800	....	....	
12,600	63,000	.010600	.001700	....	....	
13,000	65,000	.012300	.001700	....	....	
19,360	96,800	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	96,800
Elastic limit per square inch of original section .... do...	52,000
Elongation per inch after rupture .... inch..	0.2300
Elongation per inch under strain at elastic limit .... do...	0.001850
Reduction in diameter at point of rupture .... do...	.125
Reduction in area after rupture, per centum of original section	43.3
Position of rupture	″.95 from the neck
Character of broken surface	silky
Elongation of inch sections	″.31*, ″.15

No. 3773.

Marks, $\begin{smallmatrix}32\ R_{60}\ J \\ T_1\ M\end{smallmatrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000700	.000350	....	....	
6,000	30,000	.001150	.000450	....	....	
8,000	40,000	.001600	.000450	.000100	.000100	
9,200	46,000	.001750	.000150	.000100	0.	
9,400	47,000	.001800	.000050	....	....	
9,600	48,000	.001850	.000050	....	....	
9,800	49,000	.001900	.000050	....	....	
10,000	50,000	.002000	.000100	....	....	
10,200	51,000	.002100	.000100	....	....	Elastic limit.
10,400	52,000	.002350	.000250	....	....	
10,600	53,000	.002600	.000250	....	....	
10,800	54,000	.003100	.000500	....	....	
11,200	56,000	.005150	.002050	....	....	
11 600	58,000	.007000	.001850	....	....	
12,000	60,000	.008750	.001750	....	....	
12,400	62,000	.010500	.001750	....	....	
12,800	64,000	.012100	.001600	....	....	
19,360	96,800	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,800
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	0.25000
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per centum of original section		46.2
Position of rupture		1″ from the neck
Character of broken surface		silky
Elongation of inch sections		″.17, ″.33*

No. 3807.

Marks, $^{32\,R_{61}\,J}_{\;\;T_1\,M}$
Diameter, ".504.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000350	.000200	....	....	
4,000	20,000	.000750	.000400	....	....	
6,000	30,000	.001150	.000400	....	....	
8,000	40,000	.001500	.000350	.000100	.000100	
9,200	46,000	.001650	.000150	.000150	.000050	
9,400	47,000	.001750	.000100	....	....	
9,600	48,000	.001800	.000050	....	....	Elastic limit.
9,800	49,000	.002000	.000200	....	....	
10,000	50,000	.002750	.000750	....	....	
10,200	51,000	.003800	.001050	....	....	
10,600	53,000	.006250	.002450	....	....	
11,000	55,000	.008000	.001750	....	....	
11,400	57,000	.009750	.001750	....	....	
11,800	59,000	.011600	.001850	....	....	
12,200	61,000	.013600	.002000	....	....	
18,190	90,950	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	90,950
Elastic limit per square inch of original section	do	48,000
Elongation per inch after rupture	inch	0.2350
Elongation per inch under strain at elastic limit	do	.001800
Reduction in diameter at point of rupture	do	.144
Reduction in area after rupture, per centum of original section		49.1
Position of rupture		".90 from the neck
Character of broken surface		silky
Elongation of inch sections		".12, ".35*

No. 3782.

Marks, $\overset{32\,R_{63}\,J}{T_1\,M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000350	.000200	....	....	
4,000	20,000	.000600	.000250	....	....	
6,000	30,000	.000950	.000350	....	....	
8,000	40,000	.001350	.000400	0.	....	
9,200	46,000	.001600	.000250	.000050	.000050	
9,400	47,000	.001650	.000050	....	....	
9,600	48,000	.001750	.000100	....	....	
9,800	49,000	.001850	.000100	....	....	
10,000	50,000	.001950	.000100	....	....	Elastic limit.
10,200	51,000	.002150	.000200	....	....	
10,400	52,000	.002500	.000350	....	....	
10,600	53,000	.003400	.000900	....	....	
11,000	55,000	.005850	.002450	....	....	
11,400	57,000	.008000	.002150	....	....	
11,800	59,000	.009750	.001750	....	....	
12,200	61,000	.011650	.001900	....	....	
12,600	63,000	.013400	.001750	....	....	
18,810	94,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section........pounds..	94,050
Elastic limit per square inch of original section........do...	50,000
Elongation per inch after rupture........inch..	0.2500
Elongation per inch under strain at elastic limit........do...	.001950
Reduction in diameter at point of rupture........do...	.095
Reduction in area after rupture, per centum of original section........	34.0
Position of rupture........	at middle of stem
Character of broken surface........	silky, 45 per cent.; granular, 55 per cent.
Elongation of inch sections........	″.25*, ″.25*

No. 3809.

Marks, $\overset{32\,R_{67}\,J}{T_1\,M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	0.	Initial load.
200	1,000	0.	0.	0.	....	
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000700	.000400	....	....	
6,000	30,000	.001050	.000350	....	....	
8,000	40,000	.001400	.000350	0.	....	
9,200	46,000	.001600	.000200	.000050	.000050	
9,400	47,000	.001700	.000100	....	....	
9,600	48,000	.001750	.000050	....	....	
9,800	49,000	.001800	.000050	....	....	
10,000	50,000	.001900	.000100	....	....	
10,200	51,000	.001950	.000050	....	....	
10,400	52,000	.002050	.000100	....	....	Elastic limit.
10,600	53,000	.002350	.000300	....	....	
10,800	54,000	.002650	.000300	....	....	
11,000	55,000	.003300	.000650	....	....	
11,400	57,000	.005600	.002300	....	....	
11,800	59,000	.007900	.002300	....	....	
12,200	61,000	.008900	.001000	....	....	
12,600	63,000	.011000	.001100	....	....	
13,000	65,000	.013400	.002400	....	....	
19,110	95,550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,550
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	0.2200
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per centum of original section		42.3
Position of rupture		1″ from the neck
Character of broken surface		silky; slightly granular
Elongation of inch sections		″.30*,″.14

No. 3774.

Marks, $\overset{32\ R_{69}\ J}{T_1\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000600	.000250	....	....	
6,000	30,000	.000900	.000300	....	....	
8,000	40,000	.001350	.000450	0.	....	
9,200	46,000	.001550	.000200	.000050	.000050	
9,400	47,000	.001550	0.	....	....	
9,600	48,000	.001600	.000050	....	....	
9,800	49,000	.001600	0.	....	....	
10,000	50,000	.001650	.000050	....	....	
10,200	51,000	.001700	.000050	....	....	
10,400	52,000	.001850	.000150	....	....	
10,600	53,000	.001900	.000050	....	....	
10,800	54,000	.001950	.000050	....	....	
11,000	55,000	.002000	.000050	....	....	
11,200	56,000	.002100	.000100	....	....	Elastic limit.
11,400	57,000	.002400	.000300	....	....	
11,600	58,000	.002750	.000350	....	....	
11,800	59,000	.003450	.000700	....	....	
12,200	61,000	.005350	.001900	....	....	
12,600	63,000	.007750	.002400	....	....	
13,000	65,000	.009500	.001750	....	....	
13,400	67,000	.011850	.002350	....	....	
13,800	69,000	.012900	.001050	....	....	
20,240	101,200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	101,200
Elastic limit per square inch of original section	do	56,000
Elongation per inch after rupture	inch	0.2200
Elongation per inch under strain at elastic limit	do	.002100
Reduction in diameter at point of rupture	do	.135
Reduction in area after rupture, per centum of original section		46.2
Position of rupture		at the middle
Character of broken surface		silky
Elongation of inch sections		″.22*, ″.22*

No. 3775.

Marks, $\genfrac{}{}{0pt}{}{32\ R_{72}\ J}{T_1\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000600	.000250	....	....	
6,000	30,000	.000950	.000350	....	....	
8,000	40,000	.001350	.000400	0.	....	
9,200	46,000	.001500	.000150	0.	....	
9,400	47,000	.001550	.000050	....	....	
9,600	48,000	.001550	0.	....	....	
9,800	49,000	.001600	.000050	....	....	
10,000	50,000	.001650	.000050	....	....	
10,200	51,000	.001700	.000050	....	....	Elastic limit.
10,400	52,000	.001850	.000150	....	....	
10,600	53,000	.002000	.000150	....	....	
10,800	54,000	.002500	.000500	....	....	
11,200	56,000	.005600	.003100	....	....	
11,600	58,000	.007750	.002150	....	....	
12,000	60,000	.009350	.001600	....	....	
12,400	62,000	.011300	.001950	....	....	
12,800	64,000	.012900	.001600	....	....	
19,010	95,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,050
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	0.2150
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		″.85 from the neck
Character of broken surface		granular, 75 per cent.; silky, 25 per cent
Elongation of inch sections		″.14, ″.29*

No. 3783.

Marks, $\overset{32\,R_{75}\,J}{T_1\,M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000250	.000150	....	....	
4, 000	20, 000	.000600	.000350	....	....	
6, 000	30, 000	.001000	.000400	....	....	
8, 000	40, 000	.001350	.000350	.000100	.000100	
9, 200	46, 000	.001550	.000200	.000100	0.	
9, 400	47, 000	.001600	.000050	....	....	
9, 600	48, 000	.001650	.000050	....	....	
9, 800	49, 000	.001800	.000150	....	....	
10, 000	50, 000	.001900	.000100	....	....	
10, 200	51, 000	.002000	.000100	....	....	
10, 400	52, 000	.002050	.000050	....	....	
10, 600	53, 000	.002100	.000050	....	....	Elastic limit.
10, 800	54, 000	.002400	.000300	....	....	
11, 000	55, 000	.002700	.000300	....	....	
11, 200	56, 000	.003000	.000300	....	....	
11, 600	58, 000	.003450	.000450	....	....	
12, 000	60, 000	.005000	.001550	....	....	
12, 400	62, 000	.006750	.001750	....	....	
12, 800	64, 000	.008500	.001750	....	....	
13, 200	66, 000	.010350	.001850	....	....	
20, 010	100, 050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	100, 050
Elastic limit per square inch of original section	do...	53, 000
Elongation per inch after rupture	inch..	0. 2050
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per centum of original section		40. 3
Position of rupture		″.80 from the neck
Character of broken surface		silky
Elongation of inch sections		″.29*, ″.12

TABULATION OF SPECIMENS FROM 3.2-INCH STEEL B. L. RIFLES.

[Stems 2 inches long, .505 inch diameter.]

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.
			Pounds.	*Pounds.*	*Per ct.*	*Per cent.*	
3692	Tube No. 43....	Middle..	47, 000	88, 200	21. 5	46. 2	Silky.
3693	....do	...do	47, 000	85, 450	26. 0	46. 2	Do.
3694	....do	...do	48, 000	89, 800	20. 5	46. 2	Do.
3695	....do	...do	47, 000	88, 650	21. 0	49. 1	Do.
3784	Tube No. 57	...do	44, 000	85, 200	20. 0	37. 1	Do.
3785	....do	...do	45, 000	87, 350	20. 5	34. 0	Silky serrated; trace of granulation.
3786	....do	...do	48, 000	84, 050	15. 5	23. 9	Silky, serrated.
3787	....do	...do	43, 000	85, 100	24. 0	37. 1	Do.
3778	Tube No. 61	...do	43, 000	82, 900	24. 0	49. 1	Silky.
3779	....do	...do	44, 000	82, 550	24. 5	43. 3	Do.
3780	....do	...do	42, 000	81, 200	19. 0	40. 3	Do.
3781	....do	...do	44, 000	82, 400	20. 0	43. 3	Do.
3805	Jacket No. 51...	Outside.	56, 000	103, 950	20. 5	40. 3	Do.
3771	Jacket No. 53...	Middle..	50, 000	63, 000	23. 5	46. 2	Do.
3772	Jacket No. 56...	...do	51, 000	97, 900	23. 0	40. 3	Do.
3806	Jacket No. 58...	...do	52, 000	96, 800	23. 0	43. 3	Do.
3773	Jacket No. 60...	...do	51, 000	96, 800	25. 0	46. 2	Do.
3807	Jacket No. 61...	...do	48, 000	90, 950	23. 5	49. 1	Do.
3782	Jacket No. 63...	...do	50, 000	94, 050	25. 0	34. 0	Silky 45 per cent.; granular 55 per cent.
3809	Jacket No. 67...	...do	52, 000	95, 550	22. 0	43. 3	Silky, slightly granular.
3774	Jacket No. 69...	...do	56, 000	101, 200	22. 0	46. 2	Silky.
3775	Jacket No. 72...	...do	51, 000	95, 050	21. 5	37. 1	Granular 75 per cent.; silky 25 per cent.
3783	Jacket No. 75...	...do	53, 000	100, 050	20. 5	40. 3	Silky.

3.6-INCH B. L. RIFLE.

SPECIMENS FROM TUBE, JACKET AND SLEEVE.

SPECIMENS FROM TUBE.

No. 3757.

Marks, $\begin{smallmatrix}36\,R_1\,T\\ B\,T_1\,M\end{smallmatrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000350	.000200	....	....	
4,000	20,000	.000600	.000250	....	....	
6,000	30,000	.000900	.000300	....	....	
7,000	35,000	.001150	.000250	0.	....	
8,000	40,000	.001350	.000200	....	....	
8,400	42,000	.001400	.000050	.000050	.000050	
8,600	43,000	.001450	.000050	....	....	
8,800	44,000	.001500	.000050	....	....	
9,000	45,000	.001550	.000050	....	....	
9,200	46,000	.001550	0.	....	....	
9,400	47,000	.001600	.000050	....	....	
9,600	48,000	.001600	0.	....	....	
9,800	49,000	.001650	.000050	....	....	Elastic limit.
10,000	50,000	.003250	.001600	....	....	
10,200	51,000	.006350	.003100	....	....	
10,400	52,000	.007400	.001050	....	....	
10,800	54,000	.009100	.001700	....	....	
11,200	56,000	.011250	.002150	....	....	
11,600	58,000	.013250	.002000	....	....	
12,000	60,000	.015750	.002500	....	....	
12,400	62,000	.017650	.001900	....	....	
17,780	88,900	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	88,900
Elastic limit per square inch of original section	do	49,000
Elongation per inch after rupture	inch	0.2400
Elongation per inch under strain at elastic limit	do	.001650
Reduction in diameter at point of rupture	do	.115
Reduction in area after rupture, per centum of original section		40.3
Position of rupture		″.80 from the neck
Character of broken surface		silky, serrated
Elongation of inch sections		″.17, ″.31*

No. 3758.

Marks, $\substack{36\ R_1\ T \\ B\ T_2\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000350	.000200	....	....	
4,000	20,000	.000650	.000300	....	....	
6,000	30,000	.000950	.000300	....	....	
7,000	35,000	.001150	.000200	.000050	.000050	
8,000	40,000	.001400	.000250	....	....	
8,400	42,000	.001450	.000050	.000050	0.	
8,600	43,000	.001450	0.	....	....	
8,800	44,000	.001500	.000050	....	....	
9,000	45,000	.001500	0.	....	....	
9,200	46,000	.001550	.000050	....	....	
9,400	47,000	.001550	0.	....	....	
9,600	48,000	.001600	.000050	....	....	
9,800	49,000	.001650	.000050	....	....	
10,000	50,000	.001700	.000050	....	....	
10,200	51,000	.001750	.000050	....	....	Elastic limit.
10,400	52,000	.002300	.000550	....	....	
10,600	53,000	.003250	.000950	....	....	
10,800	54,000	.004750	.001500	....	....	
11,200	56,000	.007350	.002600	....	....	
11,600	58,000	.009500	.002150	....	....	
12,000	60,000	.011500	.002000	....	....	
12,400	62,000	.013900	.002400	....	....	
12,800	64,000	.015750	.001850	....	....	
18,410	92,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,050
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	0.2200
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per centum of original section		46.2
Position of rupture		″.80 from the neck
Character of broken surface		silky, serrated
Elongation of inch sections		″.32,* ″.12

No. 3759.

Marks, $\begin{smallmatrix}36\ R_1\ T\\ M\ T_1\ M\end{smallmatrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000350	.000250	....	....	
4, 000	20, 000	.000600	.000250	....	....	
6, 000	30, 000	.001000	.000400	....	....	
7, 000	35, 000	.001250	.000250	0.	....	
8, 000	40, 000	.001450	.000200	....	....	
8, 400	42, 000	.001500	.000050	.000050	.000050	
8, 600	43, 000	.001550	.000050	....	....	
8, 800	44, 000	.001600	.000050	....	....	
9, 000	45, 000	.001650	.000050	....	....	Elastic limit.
9, 200	46, 000	.001900	.000250	....	....	
9, 400	47, 000	.002400	.000500	....	....	
9, 600	48, 000	.003000	.000600	....	....	
10, 000	50, 000	.004000	.001000	....	....	
10, 400	52, 000	.006750	.002750	....	....	
10, 800	54, 000	.008250	.001500	....	....	
11, 200	56, 000	.009900	.001650	....	....	
11, 600	58, 000	.012500	.002600	....	....	
18, 290	91, 450	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	91, 450
Elastic limit per square inch of original section	do	45, 000
Elongation per inch after rupture	inch	0. 1850
Elongation per inch under strain at elastic limit	do	.001650
Reduction in diameter at point of rupture	do	.125
Reduction in area after rupture, per centum of original section		43. 3
Position of rupture		″.60 from the neck
Character of broken surface		silky, serrated
Elongation of inch sections		″.08, ″.29*

No. 3760.

Marks, $\substack{36\ R_1\ T \\ M\ T_2\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000600	.000300	....	....	
6, 000	30, 000	.000950	.000350	....	....	
7, 000	35, 000	.001100	.000150	0.	....	
8, 000	40, 000	.001250	.000150	....	....	
8, 400	42, 000	.001400	.000150	.000050	.000050	
8, 600	43, 000	.001450	.000050	....	....	
8, 800	44, 000	.001500	.000050	....	....	
9, 000	45, 000	.001550	.000050	....	....	
9, 200	46, 000	.001600	.000050	....	....	Elastic limit.
9, 400	47, 000	.001850	.000250	....	....	
9, 600	48, 000	.002800	.000950	....	....	
9, 800	49, 000	.003750	.000950	....	....	
10, 200	51, 000	.005250	.001500	....	....	
10, 600	53, 000	.007000	.001750	....	....	
11, 000	55, 000	.009000	.002000	....	....	
11, 400	57, 000	.010500	.001500	....	....	
11, 800	59, 000	.012250	.004750	....	....	
18, 300	91, 500	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	91, 500
Elastic limit per square inch of original section	do	46. 000
Elongation per inch after rupture	inch	0.2050
Elongation per inch under strain at elastic limit	do	.001600
Reduction in diameter at point of rupture	do	.125
Reduction in area after rupture, per centum of original section		43. 3
Position of rupture		1″ from neck
Character of broken surface		silky, serrated
Elongation of inch sections		″.28*, ″.13

SPECIMENS FROM JACKET.

No. 3767.

Marks, $\substack{36\ R_1\ J \\ M\ T_1\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000600	.000250	....	....	
6,000	30,000	.000950	.000350	....	....	
8,000	40,000	.001350	.000400	0.	....	
9,200	46,000	.001550	0.	.000050	.000050	
9,400	47,000	.001550	0.	....	....	
9,600	48,000	.001600	.000050	....	....	
9,800	49,000	.001650	.000050	....	....	
10,000	50,000	.001700	.000050	....	....	
10,200	51,000	.001750	.000050	....	....	
10,400	52,000	.001800	.000050	....	....	
10,600	53,000	.001850	.000050	....	....	
10,800	54,000	.001900	.000050	....	....	
11,000	55,000	.001950	.000050	....	....	
11,200	56,000	.002050	.000100	....	....	Elastic limit.
11,400	57,000	.002400	.000350	....	....	
11,600	58,000	.002900	.000500	....	....	
11,800	59,000	.003900	.001000	....	....	
12,200	61,000	.006150	.002250	....	....	
12,600	63,000	.008250	.002100	....	....	
13,000	65,000	.010200	.001950	....	....	
13,400	67,000	.012350	.002150	....	....	
13,800	69,000	.014250	.001900	....	....	
19,580	97,900	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds..	97,900
Elastic limit per square inch of original section..........do...	56,000
Elongation per inch after rupture..........inch..	0.2250
Elongation per inch under strain at elastic limit..........do...	.002050
Reduction in diameter at point of rupture..........do...	.125
Reduction in area after rupture, per centum of original section..........	43.3
Position of rupture..........	1″ from the neck
Character of broken surface..........	silky
Elongation of inch sections..........	″.15, ″.30*

No. 3768.

Mark, $^{36\,R_1\,J}_{M\,T_2M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch..	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000600	.000250	....	....	
6,000	30,000	.000900	.000300	....	....	
8,000	40,000	.001250	.000350	0.	....	
9,200	46,000	.001500	.000250	0.	....	
9,400	47,000	.001550	.000050	....	....	
9,600	48,000	.001550	0.	....	....	
9,800	49,000	.001600	.000050	....	....	
10,000	50,000	.001600	0.	....	....	Elastic limit.
10,200	51,000	.001750	.000150	....	....	
10,400	52,000	.002450	.000700	....	....	
10,600	53,000	.003150	.000700	....	....	
11,000	55,000	.004900	.001750	....	....	
11,400	57,000	.006850	.001950	....	....	
11,800	59,000	.008250	.001400	....	....	
12,200	61,000	.009900	.001650	....	....	
12,600	63,000	.011900	.002000	....	....	
19,210	96,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,050
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	0.2150
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.125
Reductionin in area after rupture, per centum, of original section		43.3
Position of rupture		1″.15 from the neck
Character of broken surface		silky
Elongation of inch sections		″.28,* ″.15

No. 3769.

Marks, $\genfrac{}{}{0pt}{}{36\,R_1\,J}{B\,T_1\,M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000600	.000300	....	....	
6, 000	30, 000	.000950	.000350	....	....	
8, 000	40, 000	.001400	.000450	.000050	.000050	
9, 200	46, 000	.001600	.000200	.000100	.000050	
9, 400	47, 000	.001650	.000050	....	....	
9, 600	48, 000	.001650	0.	....	....	
9, 800	49, 000	.001750	.000100	....	....	Elastic limit.
10, 000	50, 000	.001950	.000200	....	....	
10, 200	51, 000	.002450	.000500	....	....	
10, 400	52, 000	.003150	.000700	....	....	
10, 800	54, 000	.004500	.001350	....	....	
11, 200	56, 000	.006000	.001500	....	....	
11, 600	58, 000	.007750	.001750	....	....	
12, 000	60, 000	.009500	.001750	....	....	
12, 400	62, 000	.010750	.001250	....	....	
19, 620	98, 100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	98, 100
Elastic limit per square inch of original section	do...	49, 000
Elongation per inch after rupture	inch..	0. 2000
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per centum of original section		30. 7
Position of rupture		″.90 from the neck
Character of broken surface		silky, 30 per cent.; granular, 70 per cent
Elongation of inch sections		″.25*, ″.15

No. 3770.

Marks, $\overset{36\ R_1\ J}{B\ T_2\ I}$
Diameter, ″.505.
Sectional, area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
4,000	20,000	.000550	.000300	....	....	
6,000	30,000	.000900	.000350	....	....	
8,000	40,000	.001250	.000350	0.	....	
9,200	46,000	.001500	.000250	.000050	.000050	
9,400	47,000	.001550	.000050	....	....	
9,600	48,000	.001600	.000050	....	....	
9,800	49,000	.001650	.000050	....	....	Elastic limit.
10,000	50,000	.001900	.000250	....	....	
10,200	51,000	.002450	.000550	....	....	
10,400	52,000	.003200	.000750	....	....	
10,800	54,000	.004900	.001700	....	....	
11,200	56,000	.006400	.001500	....	....	
11,600	58,000	.007900	.001500	....	....	
12,000	60,000	.009600	.001700	....	....	
12,400	62,000	.011600	.002000	....	....	
19,350	96,750	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	96,750
Elastic limit per square inch of original section	do	49,000
Elongation per inch after rupture	inch	0.205
Elongation per inch under strain at elastic limit	do	.001650
Reduction in diameter at point of rupture	do	.115
Reduction in area after rupture, per centum of original section		40.3
Position of rupture		″.60 from the neck
Character of broken surface		silky
Elongation of inch sections		″.13, ″.28*

SPECIMENS FROM SLEEVE.

No. 3808.

Marks, $^{36\,R_1\,S}_{\;\;T_1\,M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000400	.000250	....	....	
4,000	20,000	.000650	.000250	....	....	
6,000	30,000	.000950	.000300	....	....	
8,000	40,000	.001450	.000500	....	....	
9,200	46,000	.001850	.000400	.000300	.000300	Elastic limit.
9,400	47,000	.002050	.000200	....	....	
9,600	48,000	.002450	.000400	....	....	
9,800	49,000	.003050	.000600	....	....	
10,200	51,000	.004600	.001550	....	....	
10,600	53,000	.006350	.001750	....	....	
11,000	55,000	.008100	.001750	....	....	
11,400	57,000	.010050	.001950	....	....	
11,800	59,000	.011900	.001850	....	....	
18,370	91,850	....	....	....	....	Tensile strength.

General summary

Tensile strength per square inch of original section	pounds..	91,850
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	0.2300
Elongation per inch under strain at elastic limit	do...	.001850
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per centum of original section		49.1
Position of rupture		1″ from the neck
Character of broken surface		silky
Elongation of inch sections		″.12, ″.34*

No. 3776.

Marks, $^{36\ R_1\ S}_{T_2\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
4,000	20,000	.000550	.000300	....	....	
6,000	30,000	.000950	.000400	....	....	
8,000	40,000	.001200	.000250	.000050	.000050	
9,200	46,000	.001500	.000300	.000050	0.	
9,400	47,000	.001550	.000050	....	....	
9,600	48,000	.001600	.000050	....	....	Elastic limit.
9,800	49,000	.002400	.000800	....	....	
10,000	50,000	.003400	.001000	....	....	
10,200	51,000	.004500	.001100	....	....	
10,600	53,000	.006000	.001500	....	....	
11,000	55,000	.007800	.001800	....	....	
11,400	57,000	.009900	.002100	....	....	
11,800	59,000	.011600	.001700	....	....	
12,200	61,000	.013600	.002000	....	....	
18,420	92,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,100
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	0.2200
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per centum of original section		49.1
Position of rupture		″.75 from the neck
Character of broken surface		silky
Elongation of inch sections		″.12, ″.32*

TABULATION OF SPECIMENS FROM 3.6-*INCH B. L. RIFLE.*

[Stems 2 inches long, .505 inch diameter.]

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.
			Pounds.	*Pounds.*	*Per cent.*	*Per cent.*
3757	Tube	Middle	49, 000	88, 900	24. 0	40. 3
3758	....do	....do	51, 000	92, 050	22. 0	46. 2
3759	....do	....do	45, 000	91, 450	18. 5	43. 3
3760	....do	..do	46, 000	91, 500	20. 5	43. 3
	....do	Radial				
3767	Jacket	Middle	56, 000	97, 900	22. 5	43. 3
3768	....do	....do	50, 000	96, 050	21. 5	43. 3
3769	....do	....do	49, 000	98, 100	20. 0	30. 7
3770	....do	Inside	49, 000	96, 750	20. 5	40. 3
	....do	Radial				
3808	Sleeve	Middle	46, 000	61, 850	23. 0	49. 1
3776	....do	....do	48, 000	92, 100	22. 0	49. 1

No. of test.	Position in gun.	Location of specimens.	Appearance of fracture.	Specific gravity.	Hardness.
3757	Tube	Middle	Silky, serrated		
3758	....do	....do	....do		
3759	...do	...do	....do		
3760	....do	....do	....do		
	....do	Radial		7. 8586	18. 38
3767	Jacket	Middle	Silky		
3768	....do	....do	....do		
3769	....do	....do	Silky, 30 per cent.; granular, 70 per cent.		
3770	....do	Inside	Silky		
	....do	Radial		7. 8509	20. 25
3808	Sleeve	Middle	Silky		
3776	....do	....do	....do		

3.6-INCH RIFLED MORTAR.

SPECIMENS FROM STEEL FORGING FOR BODY.

No. 3755.

Marks, $\substack{36\,\mathrm{M\,R_1\,T} \\ \mathrm{B\,T_1\,M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.		
2,000	10,000	.000450	.000300			
4,000	20,000	.000750	.000300			
6,000	30,000	.001050	.000300			
7,000	35,000	.001250	.000200	0.		
8,000	40,000	.001400	.000150			
8,400	42,000	.001500	.000100			
8,600	43,000	.001550	.000050			
8,800	44,000	.001600	.000050			
9,000	45,000	.001650	.000050			Elastic limit.
9,200	46,000	.001900	.000250			
9,400	47,000	.003250	.001350			
9,600	48,000	.004400	.001150			
10,000	50,000	.006250	.001850			
10,400	52,000	.008250	.002000			
10,800	54,000	.010150	.001900			
11,200	56,000	.012000	.001850			
11,600	58,000	.014400	.002400			
17,510	87,550					Tensile strength.

General summary.

Specific gravity of specimen taken out radially from body of mortar	7.8510
Hardness of specimen taken out radially from body of mortar	16.73
Tensile strength per square inch of original section ... pounds..	87,550
Elastic limit per square inch of original section ... do...	45,000
Elongation per inch after rupture ... inch..	0.2150
Elongation per inch under strain at elastic limit ... do...	.001650
Reduction in diameter at point of rupture ... do...	.115
Reduction in area after rupture, per centum of original section	40.3
Position of rupture	″.75 from the neck
Character of broken surface	silky
Elongation of inch sections	″.12, ″.31*

No. 3756.

Marks, 36 M R_1 T. B T_2 M.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000350	.000200	....	....	
4,000	20,000	.000650	.000300	....	....	
6,000	30,000	.001000	.000350	....	....	
7,000	35,000	.001150	.000150	0.	....	
8,000	40,000	.001350	.000200	....	....	
8,400	42,000	.001450	.000100	.000050	.000050	
8,600	43,000	.001450	0.	....	....	
8,800	44,000	.001500	.000050	....	....	
9,000	45,000	.001550	.000050	....	....	
9,200	46,000	.001650	.000100	....	....	Elastic limit.
9,400	47,000	.002250	.000600	....	....	
9,600	48,000	.003600	.001350	....	....	
9,800	49,000	.004750	.001150	....	....	
10,200	51,000	.006550	.001800	....	....	
10,600	53,000	.008600	.002050	....	....	
11,000	55,000	.010250	.001650	....	....	
11,400	57,000	.012100	.001850	....	....	
11,800	59,000	.014000	.001900	....	....	
17,780	88,900	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,900
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	0.2400
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per centum of original section		43.3
Position of rupture		1″.10 from the neck
Character of broken surface		silky
Elongation of inch sections		″.20, ″.28*

10-INCH STEEL B. L. RIFLE.

SPECIMENS FROM HOOP C_3.

No. 3700.

Marks, $\genfrac{}{}{0pt}{}{10\,R\,C_3}{M\,T_2\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.	....	
2, 500	10, 000	.000333	.000183	0.	....	
3, 750	15, 000	.000500	.000167	0.	....	
5, 000	20, 000	.000683	.000183	0.	....	
6, 250	25, 000	.000833	.000150	0.	....	
7, 500	30, 000	.001033	.000200	0.	....	
8, 750	35, 000	.001183	.000150	0.	....	
10, 000	40, 000	.001333	.000150	0.	....	
11, 250	45, 000	.001500	.000167	....	....	
11, 500	46, 000	.001567	.000067	....	....	
11, 750	47, 000	.001617	.000050	....	....	
12, 000	48, 000	.001667	.000050	....	....	
12, 250	49, 000	.001700	.000033	....	....	
12, 500	50, 000	.001733	.000033	....	....	
12, 750	51, 000	.001783	.000050	....	....	
13, 000	52, 000	.001833	.000050	....	....	
13, 250	53, 000	.001867	.000034	....	....	Elastic limit.
13, 500	54, 000	.002183	.000316	....	....	
13, 750	55, 000	.002400	.000217	....	....	
14, 000	56, 000	.002867	.000467	....	....	
14, 250	57, 000	.003233	.000366	....	....	
14, 500	58, 000	.004000	.000767	....	....	
14, 750	59, 000	.004367	.000367	....	....	
15, 000	60, 000	.005000	.000633	....	....	
15, 500	62, 000	.006367	.001367	....	....	
16, 000	64, 000	.007833	.001466	....	....	
16, 500	66, 000	.009333	.001500	....	....	
17, 000	68, 000	.010667	.001334	....	....	
17, 500	70, 000	.012250	.001583	....	....	
18, 000	72, 000	.013833	.001583	....	....	
18, 500	74, 000	.015500	.001667	....	....	
19, 000	76, 000	.017083	.001583	....	....	
19, 500	78, 000	.019000	.001917	....	....	
20, 000	80, 000	.020833	.001833	....	....	
20, 500	82, 000	.022917	.002084	....	....	
21, 000	84, 000	.025000	.002083	....	....	
21, 500	86, 000	.027333	.002333	....	....	
22, 000	88, 000	.0300	.002667	....	....	
22, 500	90, 000	.0333	.0033	....	....	
23, 000	92, 000	.0358	.0025	....	....	
23, 500	94, 000	.0400	.0042	....	....	
24, 000	96, 000	.0450	.0050	....	....	
24, 500	98, 000	.0500	.0050	....	....	
25, 000	100, 000	.0567	.0067	....	....	
25, 500	102, 000	.0650	.0083	....	....	
26, 000	104, 000	.0817	.0167	....	....	
26, 080	104, 320	.0950	.0133	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	104, 320
Elastic limit per square inch of original section	do...	53, 000
Elongation per inch after rupture	inch..	0. 1283
Elongation per inch under strain at elastic limit	do...	.001867
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		2″.90 from the neck
Character of broken surface		granular at circumference; silky center
Elongation of inch sections		″.08, ″.13, ″.30*, ″.12, ″.08, ″.06

No. 3701.

Marks, $\substack{10\ R\ C_3\\ M\ T_3\ I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.	....	
2, 500	10, 000	.000317	.000167	0.	....	
3, 750	15, 000	.000483	.000166	0.	....	
5, 000	20, 000	.000650	.000167	0.	....	
6, 250	25, 000	.000817	.000167	0.	....	
7, 500	30, 000	.000983	.000166	0.	....	
8, 750	35, 000	.001150	.000167	0.	....	
10, 000	40, 000	.001317	.000167	0.	....	
11, 250	45, 000	.001500	.000183	....	....	
11, 500	46, 000	.001550	.000050	....	....	
11, 750	47, 000	.001600	.000050	....	....	
12, 000	48, 000	.001617	.000017	....	....	
12, 520	49, 000	.001650	.000033	....	....	
12, 500	50, 000	.001683	.000033	....	....	
12, 750	51, 000	.001717	.000034	....	....	
13, 000	52, 000	.001750	.000033	....	....	Elastic limit.
13, 250	53, 000	.001833	.000083	....	....	
13, 500	54, 000	.002083	.000250	....	....	
13, 750	55, 000	.002300	.000217	....	....	
14, 000	56, 000	.002700	.000400	....	....	
14, 250	57, 000	.003150	.000450	....	....	
14, 500	58, 000	.003667	.000517	....	....	
14, 750	59, 000	.004000	.000333	....	....	
15, 000	60, 000	.004717	.000717	....	....	
15, 500	62, 000	.006083	.001366	....	....	
16, 000	64, 000	.007467	.001384	....	....	
16, 500	66, 000	.009000	.001533	....	....	
17, 000	68, 000	.010417	.001417	....	....	
17, 500	70, 000	.011667	.001250	....	....	
18, 000	72, 000	.013250	.001583	....	....	
18, 500	74, 000	.014833	.001583	....	....	
19, 000	76, 000	.016500	.001667	....	....	
19, 500	78, 000	.018167	.001667	....	....	
20, 000	80, 000	.019917	.001750	....	....	
20, 500	82, 000	.021833	.001916	....	....	
21, 000	84, 000	.024000	.002167	....	....	
21, 500	86, 000	.026250	.002250	....	....	
22, 000	88, 000	.028667	.002417	....	....	
22, 500	90, 000	.031250	.002583	....	....	
23, 000	92, 000	.034000	.002750	....	....	
23, 500	94, 000	.037500	.003500	....	....	
24, 000	96, 000	.0400	.0025	....	....	
24, 500	98, 000	.0467	.0067	....	....	
25, 000	100, 000	.0533	.0066	....	....	
25, 500	102, 000	.0600	.0067	....	....	
26, 000	104, 000	.0700	.0100	....	....	
26, 410	105, 640	.0900	.0200	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	105, 640
Elastic limit per square inch of original section ....do..	52, 000
Elongation per inch after rupture..........inch...	0. 1250
Elongation per inch under strain at elastic limit ....do..	.001750
Reduction in diameter at point of rupture..........do..	.104
Reduction in area after rupture, per centum of original section..........	33. 5
Position of rupture..........	1″.20 from the neck
Character of broken surface	granular at circumference, silky center
Elongation of inch sections	″.24*, ″.18, ″.10, ″.07, ″.07, ″.09

No. 3702.

Marks, $\genfrac{}{}{0pt}{}{10\ R\ C_2}{M\ T_4\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000317	.000184	0.	....	
3, 750	15, 000	.000483	.000166	0.	....	
5, 000	20, 000	.000650	.000167	0.	....	
6, 250	25, 000	.000817	.000167	0.	....	
7, 500	30, 000	.000983	.000166	0.	....	
8, 750	35, 000	.001150	.000167	0.	....	
10, 000	40, 000	.001317	.000167	0.	....	
11, 250	45, 000	.001467	.000150	....	....	
11, 500	46, 000	.001517	.000050	....	....	
11, 750	47, 000	.001533	.000016	....	....	
12, 000	48, 000	.001583	.000050	....	....	
12, 250	49, 000	.001633	.000050	....	....	
12, 500	50, 000	.001683	.000050	....	....	
12, 750	51, 000	.001750	.000067	....	....	Elastic limit.
13, 000	52, 000	.002233	.000483	....	....	
13, 250	53, 000	.002467	.000234	....	....	
13, 500	54, 000	.002800	.000333	....	....	
13, 750	55, 000	.003167	.000367	....	....	
14, 000	56, 000	.003800	.000633	....	....	
14, 250	57, 000	.004167	.000367	....	....	
14, 500	58, 000	.004750	.000583	....	....	
14, 750	59, 000	.005250	.000500	....	....	
15, 000	60, 000	.006117	.000867	....	....	
15, 500	62, 000	.007583	.001466	....	....	
16, 000	64, 000	.009000	.001417	....	....	
16, 500	66, 000	.010417	.001417	....	....	
17, 000	68, 000	.011833	.001416	....	....	
17, 500	70, 000	.013333	.001500	....	....	
18, 000	72, 000	.014833	.001500	....	....	
18, 500	74, 000	.016667	.001834	....	....	
19, 000	76, 000	.018533	.001866	....	....	
19, 500	78, 000	.020417	.001884	....	....	
20, 000	80, 000	.022333	.001916	....	....	
20, 500	82, 000	.024583	.002250	....	....	
21, 000	84, 000	.026833	.002250	....	....	
21, 500	86, 000	.029667	.002834	....	....	
22, 000	88, 000	.032083	.002416	....	....	
22, 500	90, 000	.035167	.003084	....	....	
23, 000	92, 000	.038500	.003333	....	....	
23, 500	94, 000	.042500	.0040	....	....	
24, 000	96, 000	.0467	.0042	....	....	
24, 500	98, 000	.0550	.0083	....	....	
25, 000	100, 000	.0633	.0083	....	....	
25, 500	102, 000	.0767	.0134	....	....	
25, 880	103, 520	.1033	.0266	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	103, 520
Elastic limit per square inch of original section	do	51, 000
Elongation per inch after rupture	inch	0. 1283
Elongation per inch under strain at elastic limit	do	.001750
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36. 4
Position of rupture		1″.75 from neck
Character of broken surface		granular at circumference, silky center
Elongation of inch sections		″.12, ″.30* ″.12, ″.10, ″.07, ″.06

12-INCH STEEL B. L. RIFLE, NO. 1.

SPECIMENS FROM HOOPS A_4 AND A_8.

HOOP A$_4$.

No. 3777.

Marks $^{12}\overset{R_1\,A_4}{T_3\,M}$
Diameter ″.564
Sectional area, .25 square inch.
Gauged length, 4.″

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000125	.000125	0.	....	
2, 500	10, 000	.000275	.000150	....	....	
5, 000	20, 000	.000575	.000300	....	....	
7, 500	30, 000	.000950	.000375	....	....	
10, 000	40, 000	.001275	.000325	....	....	
11, 250	45, 000	.001425	.000150	.000025	.000025	
12, 500	50, 000	.001600	.000175	.000025	0.	
12, 750	51, 000	.001675	.000075	....	....	
13, 000	52, 000	.001700	.000025	....	....	
13, 250	53, 000	.001750	.000050	....	....	
13, 500	54, 000	.001825	.000075	....	....	Elastic limit.
13, 750	55, 000	.001950	.000125	....	....	
14, 000	56, 000	.002150	.000200	....	....	
14, 250	57, 000	.002425	.000275	....	....	
14, 750	59, 000	.002675	.000250	....	....	
15, 250	61, 000	.005425	.002750	....	....	
15, 750	63, 000	.007250	.001825	....	....	
16, 250	65, 000	.009100	.001850	....	....	
16, 750	67, 000	.010750	.001650	....	....	
25, 340	101, 360	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101, 360
Elastic limit per square inch of original section	do...	54, 000
Elongation per inch after rupture	inch..	0. 1700
Elongation per inch under strain at elastic limit	do...	. 001825
Reduction in diameter at point of rupture	do...	. 134
Reduction in area after rupture, per centum of original section		41. 9
Position of rupture		1″. 50 from neck
Character of broken surface		silky, slightly granular
Elongation of inch sections		″. 09, ″. 12, ″. 32*, ″. 15

HOOP A_8.

No. 3766.

Marks, $^{12}\overset{R_1A_8}{T_1O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000050	.000050	0.	....	
2, 500	10, 000	.000225	.000175	....	....	
5, 000	20, 000	.000550	.000325	....	....	
7, 500	30, 000	.000875	.000325	....	....	
10, 000	40, 000	.001275	.000400	....	....	
11, 250	45, 000	.001400	.000125	0.	....	
12, 500	50, 000	.001600	.000200	0.	....	
12, 750	51, 000	.001675	.000075	....	....	
13, 000	52, 000	.001700	.000025	....	....	
13, 250	53, 000	.001725	.000025	....	....	
13, 500	54, 000	.001750	.000025	....	....	
13, 750	55, 000	.001775	.000025	....	....	
14, 000	56, 000	.001800	.000025	....	....	Elastic limit.
14, 250	57, 000	.001875	.000075	....	....	
14, 500	58, 000	.002000	.000125	....	....	
14, 750	59, 000	.002775	.000775	....	....	
15, 250	61, 000	.004975	.002200	....	....	
15, 750	63, 000	.006475	.001500	....	....	
16, 250	65, 000	.008025	.001550	....	....	
16, 750	67, 000	.009650	.001625	....	....	
17, 250	69, 000	.011275	.001625	....	....	
25, 880	103, 520	....	....	....	....	Tensile strength.

General summary.

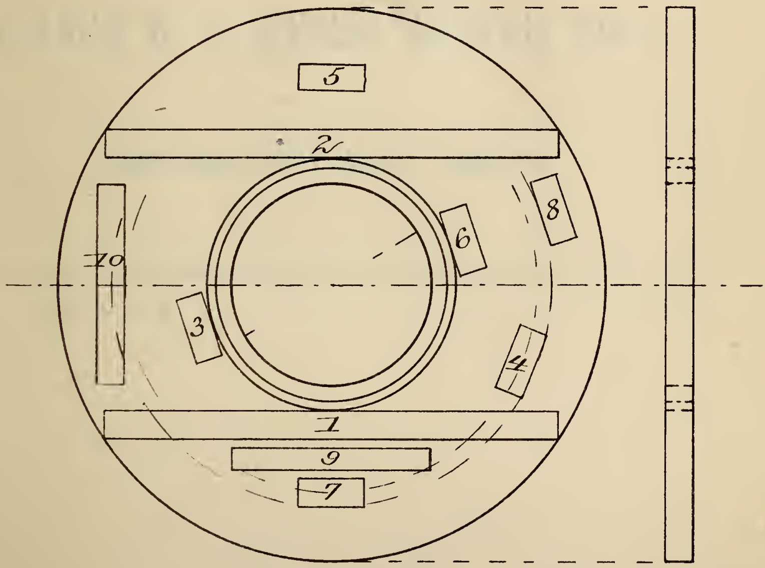
Tensile strength per square inch of original section	pounds..	103, 520
Elastic limit per square inch of original section	do...	56, 000
Elongation per inch after rupture	inch..	0. 1725
Elongation per inch under strain at elastic limit	do...	. 001800
Reduction in diameter at point of rupture	do...	. 144
Reduction in area after rupture, per centum of original section		44. 6
Position of rupture		2″.1 from the neck
Character of broken surface		silky
Elongation of inch sections		″.09, ″.17, ″.33*, ″.10

12-INCH B. L. RIFLED MORTARS.

SPECIMENS FROM CAST-IRON BODY, TRUNNION HOOP, HOOPS A_3, A_4,
A_5, A_6, A_7, AND B_1, AND GAS-CHECK CUP FOR MORTAR NO. 1;
SPINDLE FOR MORTAR NO. 2; HINGE-PIN FOR MORTAR
NO. 3; TRANSVERSE ROLLER FOR MORTAR NO. 3;
FACE-PLATE FOR MORTAR NO. 7; AND
BREECH BLOCK FOR MORTAR NO. 10.

12 inch B. L. Rifled Mortars.
Cast iron bodies.

Location of specimens in Initial tension discs.



H Ex.....14.........51 1

12-INCH B. L. RIFLED MORTAR, NO. 1.

CAST-IRON BODY, FIRST CASTING.

SPECIMENS FROM MUZZLE RING.

No. 3753.

Marks, $\overset{12\,\mathrm{M\,C}}{\mathrm{M\,T_1}}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.000050	.000050	0.	....	
3, 000	3, 000	.000100	.000050	0.	....	
4, 000	4, 000	.000150	.000050	0.	....	
5, 000	5, 000	.000200	.000050	0.	....	
6, 000	6, 000	.000250	.000050	.000005	.000005	
7, 000	7, 000	.000300	.000050	.000005	0.	
8, 000	8, 000	.000350	.000050	.000005	0.	
9, 000	9, 000	.000405	.000055	.000015	.000010	
10, 000	10, 000	.000460	.000055	.000025	.000010	
11, 000	11, 000	.000525	.000065	.000030	.000005	
12, 000	12, 000	.000585	.000060	.000035	.000005	
13, 000	13, 000	.000650	.000065	.000045	.000010	
14, 000	14, 000	.000715	.000065	.000055	.000010	
15, 000	15, 000	.000785	.000070	.000065	.000010	
16, 000	16, 000	.000865	.000080	.000085	.000020	
17, 000	17, 000	.000945	.000080	.000105	.000020	
18, 000	18, 000	.001040	.000095	.000140	.000035	
19, 000	19, 000	.001135	.000095	.000185	.000045	
20, 000	20, 000	.001250	.000115	.000235	.000050	
21, 000	21, 000	.001380	.000130	.000290	.000055	
22, 000	22, 000	.001515	.000135	.000350	.000060	
23, 000	23, 000	.001690	.000175	.000460	.000110	
24, 000	24, 000	.001920	.000230	.000600	.000140	
25, 000	25, 000	.002235	.000315	....	....	
Observations on elasticity after overstraining.						
24, 000	24, 000	.002200	—.000035	....	....	
22, 000	22, 000	.002090	—.000110	....	....	
20, 000	20, 000	.001985	—.000105	....	....	
18, 000	18, 000	.001875	—.000110	....	....	
16, 000	16, 000	.001760	—.000115	....	....	
14, 000	14, 000	.001650	—.000110	....	....	
12, 000	12, 000	.001530	—.000120	....	....	
10, 000	10, 000	.001415	—.000115	....	....	
8, 000	8, 000	.001295	—.000120	....	....	
6, 000	6, 000	.001170	—.000125	....	....	
4, 000	4, 000	.001040	—.000130	....	....	
2, 000	2, 000	.000905	—.000135	....	....	
1, 000	1, 000	.000840	—.000065	.000840	.000240	
2, 000	2, 000	.000885	.000045	....	....	
4, 000	4, 000	.000995	.000110	....	....	
6, 000	5, 000	.001100	.000105	....	....	
8, 000	8, 000	.001210	.000110	....	....	
10, 000	10, 000	.001315	.000105	....	....	
12, 000	12, 000	.001425	.000110	....	....	
14, 000	14, 000	.001550	.000125	....	....	
16, 000	16, 000	.001660	.000110	....	....	
18, 000	18, 000	.001785	.000125	....	....	
20, 000	20, 000	.001910	.000125	....	....	
22, 000	22, 000	.002040	.000130	....	....	
24, 000	24, 000	.002185	.000145	....	....	
25, 000	25, 000	.002275	.000090	....	....	
26, 000	26, 000	.002525	.000250	.001025	.000185	
29, 920	29, 920	....	....	....	....	Tensile strength.

Fractured 1″.6 from the neck. Appearance, uniform granular; mottled.

No. 3754.

Marks, $^{12\,M\,C}_{M\,T_2}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.000050	.000050	0.	....	
3, 000	3, 000	.000100	.000050	0.	....	
4, 000	4, 000	.000145	.000045	0.	....	
5, 000	5, 000	.000195	.000050	0.	....	
6, 000	6, 000	.000250	.000055	.000005	.000005	
7, 000	7, 000	.000300	.000050	.000015	.000010	
8, 000	8, 000	.000350	.000050	.000020	.000005	
9, 000	9, 000	.000405	.000050	.000020	.0	
10, 000	10, 000	.000460	.000055	.000025	.000005	
11, 000	11, 000	.000520	.000060	.000030	.000005	
12, 000	12, 000	.000590	.000070	.000040	.000010	
13, 000	13, 000	.000650	.000060	.000050	.000010	
14, 000	14, 000	.000720	.000070	.000065	.000015	
15, 000	15, 000	.000800	.000080	.000075	.000010	
16, 000	16, 000	.000875	.000075	.000100	.000025	
17, 000	17, 000	.000960	.000085	.000120	.000020	
18, 000	18, 000	.001050	.000090	.000150	.000030	
19, 000	19, 000	.001150	.000100	.000190	.000040	
20, 000	20, 000	.001250	.000100	.000230	.000040	
21, 000	21, 000	.001375	.000125	.000285	.000055	
22, 000	22, 000	.001540	.000165	.000370	.000085	
23, 000	23, 000	.001705	.000165	.000475	.000105	
24, 000	24, 000	.001940	.000235	.000620	.000145	
25, 000	25, 000	.002200	.000260	.000800	.000180	
26, 000	26, 000	.002525	.000325	.001035	.000235	Tensile strength.
29, 690	29, 690	....	....	....	....	

Fractured 2″.1 from the neck. Appearance, uniform granular; mottled.

Specific gravity, 7.2501.

Hardness, 15.83.

TENACITY SPECIMENS.

Marks, 12 M C, with additional marks shown in table.

No. of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	
2873	M T 3 I	1.129	1.00	30,910	30,910	Uniform granular; mottled.
2874	M T 4 O	1.129	1.00	31,100	31,100	
2875	M T 5 M	1.129	1.00	31,180	31,180	
2876	M T 6 Q	1.129	1.00	31,330	31,330	
2877	M T 7 Q	1.129	1.00	31,750	31,750	
2878	M T 8 Q	1.129	1.00	31,820	31,820	
		Specific gravity.		Hardness.		
2873	M T 3 I	7.2495	....	16.15	....	
2874	M T 4 O	7.2472	....	15.83	....	

No. 773.

Marks, $\overset{12\ \mathrm{M\ C}}{\mathrm{M\ T}_9}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.00021	.00021	.00001	.00001	
6,000	6,000	.00026	.00005	....	....	
7,000	7,000	.00031	.00005	....	....	
8,000	8,000	.00036	.00005	....	....	
9,000	9,000	.00041	.00005	....	....	
10,000	10,000	.00047	.00006	.00003	.00002	
11,000	11,000	.00052	.00005	....	....	
12,000	12,000	.00058	.00006	....	....	
13,000	13,000	.00063	.00005	....	....	
14,000	14,000	.00068	.00005	....	....	
15,000	15,000	.00074	.00006	.00006	.00003	
16,000	16,000	.00081	.00007	....	....	
17,000	17,000	.00087	.00006	....	....	
18,000	18,000	.00093	.00006	....	....	
19,000	19,000	.00099	.00006	....	....	
20,000	20,000	.00104	.00005	.00012	.00006	
21,000	21,000	.00112	.00008	....	....	
22,000	22,000	.00117	.00005	....	....	
23,000	23,000	.00125	.00008	....	....	
24,000	24,000	.00132	.00007	....	....	
25,000	25,000	.00139	.00007	.00021	.00009	
26,000	26,000	.00148	.00009	....	....	
27,000	27,000	.00157	.00009	....	....	
28,000	28,000	.00165	.00008	....	....	
29,000	29,000	.00180	.00015	....	....	
30,000	30,000	.00191	.00011	.00047	.00026	
31,000	31,000	.00203	.00012	....	....	
32,000	32,000	.00219	.00016	....	....	
33,000	33,000	.00238	.00019	....	....	
34,000	34,000	.00252	.00014	....	....	
35,000	35,000	.00274	.00022	.00101	.00054	
36,000	36,000	.00302	.00028	....	....	
37,000	37,000	.00332	.00030	....	....	
38,000	38,000	.00360	.00028	....	....	
39,000	39,000	.00395	.00035	....	....	
40,000	40,000	.00462	.00067	.00260	.00159	
53,250	53,250	....	....	....	....	Ultimate strength.

Failed by triple flexure.

No. 774.

Marks, $\frac{12\ \mathrm{M\ C}}{\mathrm{M\ T}_{10}}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.00005	.00005	....	....	
3, 000	3, 000	.00010	.00005	....	....	
4, 000	4, 000	.00015	.00005	....	....	
5, 000	5, 000	.00020	.00005	0.	....	
6, 000	6, 000	.00026	.00006	....	....	
7, 000	7, 000	.00030	.00004	....	....	
8, 000	8, 000	.00036	.00006	....	....	
9, 000	9, 000	.00041	.00005	....	....	
10, 000	10, 000	.00046	.00005	.00003	.00003	
11, 000	11, 000	.00051	.00005	....	....	
12, 000	12, 000	.00057	.00006	....	....	
13, 000	13, 000	.00062	.00005	....	....	
14, 000	14, 000	.00068	.00006	....	....	
15, 000	15, 000	.00074	.00006	.00006	.00003	
16, 000	16, 000	.00080	.00006	....	....	
17, 000	17, 000	.00086	.00006	....	....	
18, 000	18, 000	.00091	.00005	....	....	
19, 000	19, 000	.00098	.00007	....	....	
20, 000	20, 000	.00105	.00007	.00011	.00005	
21, 000	21, 000	.00111	.00006	....	....	
22, 000	22, 000	.00118	.00007	....	....	
23, 000	23, 000	.00125	.00007	....	....	
24, 000	24, 000	.00132	.00007	....	....	
25, 000	25, 000	.00139	.00007	.00021	.00010	
26, 000	26, 000	.00148	.00009	....	....	
27, 000	27, 000	.00157	.00009	....	....	
28, 000	28, 000	.00166	.00009	....	....	
29, 000	29, 000	.00176	.00010	....	....	
30, 000	30, 000	.00187	.00011	.00045	.00024	
31, 000	31, 000	.00201	.00014	....	....	
32, 000	32, 000	.00215	.00014	....	....	
33, 000	33, 000	.00231	.00016	....	....	
34, 000	34, 000	.00251	.00020	....	....	
35, 000	35, 000	.00278	.00027	.00106	.00061	
36, 000	36, 000	.00302	.00024	....	....	
37, 000	37, 000	.00327	.00025	....	....	
38, 000	38, 000	.00359	.00032	....	....	
39, 000	39, 000	.00392	.00033	....	....	
40, 000	40, 000	.00448	.00056	.00244	.00138	
53, 560	53, 560	....	....	....	....	Ultimate strength.

Failed by triple flexure.

TENACITY SPECIMENS FROM BREECH RING.

Marks, 12 M R_1 T R_2 ,and additional marks in table.

No. of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	
2775	B L 7 O.....	1.129	1.00	29,590	29,590	Uniform, medium; coarse granular.
2776	B L 8 M*...	1.129	1.00	29,320	29,320	
2777	B L 6 I.....	1.129	1.00	26,300	26,300	

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* Specific gravity, 7.2575; hardness, 16.07.

12-INCH B. L. RIFLED MORTAR, NO. 1.

CAST-IRON BODY, SECOND CASTING.

SPECIMENS FROM BREECH RING.

No. 3763.

Marks, $^{12}\mathrm{M}\underset{\mathrm{B}}{\mathrm{R}_1}\underset{\mathrm{T}_1}{\mathrm{T}}\mathrm{R}_2$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.000050	.000050	....	....	
3, 000	3, 000	.000100	.000050	....	....	
4, 000	4, 000	.000155	.000055	....	....	
5, 000	5, 000	.000205	.000050	.000005	.000005	
6, 000	6, 000	.000260	.000055	....	....	
7, 000	7, 000	.000325	.000065	....	....	
8, 000	8, 000	.000385	.000060	....	....	
9, 000	9, 000	.000445	.000060	....	....	
10, 000	10, 000	.000500	.000055	.000040	.000035	
11, 000	11, 000	.000570	.000070	....	....	
12, 000	12, 000	.000640	.000070	.000050	.000010	
13, 000	13, 000	.000710	.000070	....	....	
14, 000	14, 000	.000790	.000080	.000085	.000035	
15, 000	15, 000	.000855	.000065	....	....	
16, 000	16, 000	.000945	.000090	.000120	.000035	
17, 000	17, 000	.001030	.000085	....	....	
18, 000	18, 000	.001130	.000100	.000175	.000055	
19, 000	19, 000	.001235	.000105	....	....	
20, 000	20, 000	.001345	.000110	.000245	.000070	
21, 000	21, 000	.001495	.000150	....	....	
22, 000	22, 000	.001640	.000145	.000385	.000140	
23, 000	23, 000	.001820	.000180	....	....	
24, 000	24, 000	.002010	.000190	.000595	.000210	
25, 000	25, 000	.002245	.000235	....	....	
27, 230	27, 230	....	....	....	....	Tensile strength.

Fractured 6″ from neck. Appearance, granular; mottled.

No. 3764.

Marks, $\genfrac{}{}{0pt}{}{12\,M\,R_1\,T\,R_2}{B\,T_2}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000055	.000055	....	....	
3,000	3,000	.000110	.000055	....	....	
4,000	4,000	.000160	.000050	....	....	
5,000	5,000	.000215	.000055	.000005	.000005	
6,000	6,000	.000265	.000050	....	....	
7,000	7,000	.000325	.000060	....	....	
8,000	8,000	.000385	.000060	....	....	
9,000	9,000	.000450	.000065	....	....	
10,000	10,000	.000510	.000060	.000040	.000035	
11,000	11,000	.000575	.000065	....	....	
12,000	12,000	.000645	.000070	.000050	.000010	
13,000	13,000	.000710	.000065	....	....	
14,000	14,000	.000790	.000080	.000080	.000030	
15,000	15,000	.000860	.000070	....	....	
16,000	16,000	.000945	.000085	.000110	.000030	
17,000	17,000	.001040	.000095	....	....	
18,000	18,000	.001135	.000095	.000165	.000055	
19,000	19,000	.001240	.000105	....	....	
20,000	20,000	.001350	.000110	.000250	.000085	
21,000	21,000	.001490	.000140	....	....	
22,000	22,000	.001640	.000150	.000390	.000140	
23,000	23,000	.001830	.000190	....	....	
24,000	24,000	.002010	.000180	.000590	.000200	
25,000	25,000	.002275	.000265	....	....	
27,320	27,320	....	....	....	....	Tensile strength.

Fractured 6″ from neck. Appearance, ganular; mottled.

TENACITY SPECIMENS.

Marks, 12 M R_1 T R_2 and additional marks in table.

No. of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	
3044	B T 3 I	1.129	1.00	31,060	31,060	Granular; mottled.
3045	B T 4 O	1.129	1.00	32,810	32,810	Do.
3046	B T 5 M* ...	1.129	1.00	33,080	33,080	Do.
3047	B L 6 M	1.129	1.00	32,010	32,010	Do.
3048	B L 7 O	1.129	1.00	32,840	32,840	Do.
3049	B L 8 M	1.129	1.00	31,690	31,690	Do.

* Specific gravity, 7.2478; hardness, 16.23.

No. 775.

Marks, $^{12\,M\,R_1\,T\,R_2}_{B\,T_9}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.00006	.00006	....	....	
3, 000	3, 000	.00011	.00005	....	....	
4, 000	4, 000	.00016	.00005	....	....	
5, 000	5, 000	.00022	.00006	.00001	.00001	
6, 000	6, 000	.00027	.00005	....	....	
7, 000	7, 000	.00034	.00007	....	....	
8, 000	8, 000	.00040	.00006	....	....	
9, 000	9, 000	.00046	.00006	....	....	
10, 000	10, 000	.00050	.00004	.00006	.00005	
11, 000	11, 000	.00056	.00006	....	....	
12, 000	12, 000	.00062	.00006	....	....	
13, 000	13, 000	.00067	.00005	....	....	
14, 000	14, 000	.00073	.00006	....	....	
15, 000	15, 000	.00080	.00007	.00009	.00003	
16, 000	16, 000	.00086	.00006	....	....	
17, 000	17, 000	.00092	.00006	....	....	
18, 000	18, 000	.00097	.00005	....	....	
19, 000	19, 000	.00105	.00008	....	....	
20, 000	20, 000	.00111	.00006	.00013	.00004	
21, 000	21, 000	.00118	.00007	....	....	
22, 000	22, 000	.00126	.00008	....	....	
23, 000	23, 000	.00131	.00005	....	....	
24, 000	24, 000	.00140	.00009	....	....	
25, 000	25, 000	.00148	.00008	.00025	.00012	
26, 000	26, 000	.00158	.00010	....	....	
27, 000	27, 000	.00167	.00009	....	....	
28, 000	28, 000	.00176	.00009	....	....	
29, 000	29, 000	.00186	.00010	....	....	
30, 000	30, 000	.00200	.00014	.00048	.00023	
31, 000	31, 000	.00213	.00013	....	....	
32, 000	32, 000	.00227	.00014	....	....	
33, 000	33, 000	.00242	.00015	....	....	
34, 000	34, 000	.00261	.00019	....	....	
35, 000	35, 000	.00283	.00022	.00101	.00053	
36, 000	36, 000	.00312	.00029	....	....	
37, 000	37, 000	.00336	.00024	....	....	
38, 000	38, 000	.00362	.00026	....	....	Rested one hour under load.
38, 000	38, 000	.00414	.00052	....	....	After resting.
39, 000	39, 000	.00421	.00007	....	....	
40, 000	40, 000	.00442	.00021	.00230	.00129	
41, 000	41, 000	.00480	.00038	....	....	
42, 000	42, 000	.00532	.00052	.00304	.00074	
54, 980	54, 980	....	....	....	....	Ultimate strength.

Failed by triple flexure.

No. 776.

Marks, $^{12}\begin{smallmatrix}\mathrm{M\,R_1\,T\,R_2}\\ \mathrm{B\,R_{10}}\end{smallmatrix}$
Length, 10″.60.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	Initial load.
1, 000	1, 000	0.	0.	0.	0.	
2, 000	2, 000	.00006	.00006	....	....	
3, 000	3, 000	.00010	.00004	....	....	
4, 000	4, 000	.00016	.00006	....	....	
5, 000	5, 000	.00020	.00004	0.	....	
6, 000	6, 000	.00024	.00004	....	....	
7, 000	7, 000	.00030	.00006	....	....	
8, 000	8, 000	.00036	.00006	....	....	
9, 000	9, 000	.00040	.00004	....	....	
10, 000	10, 000	.00046	.00006	.00002	.00002	
11, 000	11, 000	.00050	.00004	....	....	
12, 000	12, 000	.00052	.00002	....	....	
13, 000	13, 000	.00058	.00006	....	....	
14, 000	14, 000	.00066	.00008	....	....	
15, 000	15, 000	.00070	.00004	.00004	.00002	
16, 000	16, 000	.00074	.00004	....	....	
17, 000	17, 000	.00080	.00006	....	....	
18, 000	18, 000	.00086	.00006	....	....	
19, 000	19, 000	.00094	.00008	....	....	
20, 000	20, 000	.00098	.00004	.00006	.00002	
21, 000	21, 000	.00104	.00006	....	....	
22, 000	22, 000	.00112	.00008	....	....	
23, 000	23, 000	.00120	.00008	....	....	
24, 000	24, 000	.00126	.00006	....	....	
25, 000	25, 000	.00136	.00010	.00016	.00010	
26, 000	26, 000	.00144	.00008	....	....	
27, 000	27, 000	.00152	.00008	....	....	
28, 000	28, 000	.00162	.00010	....	....	
29, 000	29, 000	.00172	.00010	....	....	
30, 000	30, 000	.00184	.00012	.00036	.00020	
31, 000	31, 000	.00196	.00012	....	....	
32, 000	32, 000	.00210	.00014	....	....	
33, 000	33, 000	.00228	.00018	....	....	
34, 000	34, 000	.00248	.00020	....	....	
35, 000	35, 000	.00266	.00018	.00088	.00052	
36, 000	36, 000	.00296	.00030	....	....	
37, 000	37, 000	.00320	.00024	....	....	
38, 000	38, 000	.00346	.00026	....	....	
39, 000	39, 000	.00382	.00036	....	....	
40, 000	40, 000	.00420	.00038	.00214	.00126	
60, 240	60, 240	....	....	....	....	Ultimate strength.

Failed by triple flexure.

SPECIMENS FROM MUZZLE RING.

No. 3761.

Marks, $^{12}\underset{M\,T_1}{M\,R_1\,T\,R_1}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Succesive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	.0	0.	0.	Initial load.
2, 000	2, 000	.000060	.000060	....	....	
3, 000	3, 000	.000110	.000050	....	....	
4, 000	4, 000	.0, 0160	.000050	....	....	
5, 000	5, 000	.000210	.000050	.000015	.000015	
6, 000	6, 000	.000260	.000050	....	....	
7, 000	7, 000	.000315	.000055	....	....	
8, 000	8, 000	.000380	.000065	....	....	
9, 000	9, 000	.000435	.000055	....	....	
10, 000	10, 000	.000500	.000065	.000045	.000030	
11, 000	11, 000	.000560	.000060	....	....	
12, 000	12, 000	.000630	.000070	.000065	.000020	
13, 000	13, 000	.000690	.000060	....	....	
14, 000	14, 000	.000760	.000070	.000095	.000030	
15, 000	15, 000	.000840	.000080	....	....	
16, 000	16, 000	.000930	.000090	.000135	.000040	
17, 000	17, 000	.001005	.000075	....	....	
18, 000	18, 000	.001105	.000100	.000190	.000055	
19, 000	19, 000	.001205	.000100	....	....	
20, 000	20, 000	.001335	.000130	.000285	.000095	
21, 000	21, 000	.001455	.000120	....	....	
22, 400	22, 000	.001620	.000165	.000430	.000145	
23, 000	23, 000	.001810	.000190	....	....	
24, 000	24, 000	.002040	.000230	.000675	.000245	
25, 000	25, 000	.002270	.000230	....	....	
29. 060	29, 060	....	....	....	....	Tensile strength.

Fractured $1\frac{3}{4}''$ from neck. Appearance, granular; mottled.

No. 3762.

Marks, $\substack{12\,M\,R_1\,T\,R_1\\ M\,T_2}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.000050	.000050	....	....	
3, 000	3, 000	.000100	.000050	....	....	
4, 000	4, 000	.000150	.000050	....	....	
5, 000	5, 000	.000200	.000050	.000005	.000005	
6, 000	6, 009	.000250	.000050	....	....	
7, 000	7, 000	.000315	.000065	....	....	
8, 000	8, 000	.000370	.000055	....	....	
9, 000	9, 000	.000425	.000055	....	....	
10, 000	10, 000	.000485	.000060	.000035	.000030	
11, 000	11, 000	.000550	.000065	....	....	
12, 000	12, 000	.000610	.000060	.000060	.000025	
13, 000	13, 000	.000685	.000075	....	....	
14, 000	14, 000	.000760	.000075	.000080	.000020	
15, 000	15, 000	.000830	.000070	....	....	
16, 000	16, 000	.000910	.000080	.000120	.000040	
17, 000	17, 000	.000995	.000085	....	....	
18, 000	18, 000	.001085	.000090	.000170	.000050	
19, 000	19, 000	.001190	.000105	....	....	
20, 000	20, 000	.001320	.000130	.000265	.000095	
21, 000	21, 000	.001450	.000130	....	....	
22, 000	22, 000	.001600	.000150	.000410	.000145	
23, 000	23, 000	.001800	.000200	....	....	
24, 000	24, 000	.002035	.000235	.000670	.000260	
25, 000	25, 000	.002300	.000265	....	....	
28, 980	28, 980	....	....	....	....	Tensile strength.

Fractured 1¾″ from neck. Appearance, granular; mottled.

TENACITY SPECIMENS.

Marks, 12 M R_1 T R_1 and additional marks in table.

No. of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	
3041	M T 3 I	1. 129	1. 00	29, 920	29, 920	Granular; mottled.
3042	M T 4 O	1. 129	1. 00	29, 880	29, 880	Do.
3043	M T 5 M*	1. 129	1. 00	31, 070	31, 070	Do.
3050	M T 6 I	1. 129	1. 00	30, 020	30, 020	Do.
3051	M T 7 O	1. 129	1. 00	30, 460	30, 460	Do.
3052	M T 8 M	1. 129	1. 00	30, 450	30, 450	Do.

* Specific gravity, 7.2380; hardness, 16.56.

No. 777.

Marks, $^{12\,M\,R_1\,T\,R_1}_{M\,T_9}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	....	Initial load.
2,000	2,000	.00003	.00003	....	....	
3,000	3,000	.00008	.00005	....	....	
4,000	4,000	.00013	.00005	....	....	
5,000	5,000	.00018	.00005	0.	....	
6,000	6,000	.00022	.00004	....	....	
7,000	7,000	.00028	.00006	....	....	
8,000	8,000	.00033	.00005	....	....	
9,000	9,000	.00039	.00006	....	....	
10,000	10,000	.00043	.00004	.00002	.00002	
11,000	11,000	.00048	.00005	....	....	
12,000	12,000	.00053	.00005	....	....	
13,000	13,000	.00059	.00006	....	....	
14,000	14,000	.00064	.00005	....	....	
15,000	15,000	.00070	.00006	.00003	.00001	
16,000	16,000	.00075	.00005	....	....	
17,000	17,000	.00082	.00007	....	....	
18,000	18,000	.00088	.00006	....	....	
19,000	19,000	.00094	.00006	....	....	
20,000	20,000	.00101	.00007	.00009	.00006	
21,000	21,000	.00106	.00005	....	....	
22,000	22,000	.00113	.00007	....	....	
23,000	23,000	.00120	.00007	....	....	
24,000	24,000	.00128	.00008	....	....	
25,000	25,000	.00134	.00006	.00019	.00010	
26,000	26,000	.00143	.00009	....	....	
27,000	27,000	.00153	.00010	....	....	
28,000	28,000	.00163	.00010	....	....	
29,000	29,000	.00171	.00008	....	....	
30,000	30,000	.00183	.00012	.00041	.00022	
31,000	31,000	.00201	.00018	....	....	
32,000	32,000	.00215	.00014	....	....	
33,000	33,000	.00232	.00017	....	....	
34,000	34,000	.00251	.00019	....	....	
35,000	35,000	.00274	.00023	.00101	.00060	
36,000	36,000	.00298	.00024	....	....	
37,000	37,000	.00323	.00025	....	....	
38,000	38,000	.00369	.00046	....	....	
39,000	39,000	.00390	.00021	....	....	
40,000	40,000	.00441	.00051	.00239	.00138	
53,200	53,200	....	....	....	....	Ultimate strength.

Failed by triple flexure.

No. 778.

Marks, $\overset{12\,M\,R_1\,T\,R_1}{M\,T_{10}}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00003	.00003			
3,000	3,000	.00010	.00007			
4,000	4,000	.00014	.00004			
5,000	5,000	.00020	.00006	0.		
6,000	6,000	.00024	.00004			
7,000	7,000	.00030	.00006			
8,000	8,000	.00035	.00005			
9,000	9,000	.00040	.00005			
10,000	10,000	.00046	.00006	.00002	.00002	
11,000	11,000	.00051	.00005			
12,000	12,000	.00057	.00006			
13,000	13,000	.00062	.00005			
14,000	14,000	.00068	.00006			
15,000	15,000	.00073	.00005	.00007	.00005	
16,000	16,000	.00080	.00007			
17,000	17,000	.00087	.00007			
18,000	18,000	.00092	.00005			
19,000	19,000	.00099	.00007			
20,000	20,000	.00105	.00006	.00011	.00004	
21,000	21,000	.00112	.00007			
22,000	22,000	.00120	.00008			
23,000	23,000	.00128	.00008			
24,000	24,000	.00134	.00006			
25,000	25,000	.00141	.00007	.00021	.00010	
26,000	26,000	.00152	.00011			
27,000	27,000	.00161	.00009			
28,000	28,000	.00171	.00010			
29,000	29,000	.00182	.00011			
30,000	30,000	.00194	.00012	.00047	.00026	
31,000	31,000	.00211	.00017			
32,000	32,000	.00225	.00014			
33,000	33,000	.00240	.00015			
34,000	34,000	.00262	.00022			
35,000	35,000	.00287	.00025	.00110	.00063	
36,000	36,000	.00320	.00033			
37,000	37,000	.00350	.00030			
38,000	38,000	.00385	.00035			
39,000	39,000	.00425	.00040			
40,000	40,000	.00486	.00061	.00278	.00168	
54,050	54,050					Ultimate strength.

Failed by triple flexure.

TRUNNION HOOP.

No. 3747.

Marks, $\overset{12\,\mathrm{MR_1TH}}{\mathrm{T_1I}}$
Diameter, ".564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initail load.
1, 250	5, 000	.000125	.000125	0.	....	
2, 500	10, 000	.000300	.000175	0.	....	
3, 750	15, 000	.000500	.000200	0.	....	
5, 000	20, 000	.000725	.000225	.000025	.000025	
6, 250	25, 000	.000950	.000225	.000025	0.	
7, 500	30, 000	.001125	.000175	.000025	0.	
8, 750	35, 000	.001300	.000175	.000050	.000025	
10, 000	40, 000	.001500	.000200	.000075	.000025	
11, 250	45, 000	.001700	.000200	....	....	
12, 500	50, 000	.001900	.000200	....	....	
13, 750	55, 000	.002125	.000225	....	....	
14, 000	56, 000	.002200	.000075	....	....	
14, 250	57, 000	.002250	.000050	....	....	
14, 500	58, 000	.002350	.000100	....	....	
14, 750	59, 000	.002400	.000050	....	....	Elastic limit.
15, 000	60, 000	.002500	.000100	....	....	
15, 250	61, 000	.002750	.000250	....	....	
15, 500	62, 000	.003050	.000300	....	....	
15, 750	63, 000	.003425	.000375	....	....	
16, 000	64, 000	.004500	.001075	....	....	
16, 500	66, 000	.006550	.002050	....	....	
17, 000	68, 000	.008500	.001950	....	....	
17, 500	70, 000	.010000	.001500	....	....	
18, 000	72, 000	.011750	.001700	....	....	
18, 500	74, 000	.013450	.001750	....	....	
19, 000	76, 000	.015625	.002175	....	....	
19, 500	78, 000	.017000	.001375	....	....	
20, 000	80, 000	.019000	.002000	....	....	
20, 500	82, 000	.021175	.002175	....	....	
21, 000	84, 000	.023500	.002325	....	....	
21, 500	86, 000	.025625	.002125	....	....	
22, 000	88, 000	.028258	.002625	....	....	
22, 500	90, 000	.030875	.002625	....	....	
23, 000	92, 000	.034500	.003625	....	....	
23, 500	94, 000	.038125	.003625	....	....	
24, 000	96, 000	.042000	.003875	....	....	
24, 500	98, 000	.047000	.005000	....	....	
25, 000	100, 000	.053750	.006750	....	....	
25, 500	102, 000	.0600	.006250	....	....	
26, 000	104, 000	.0750	.0150	....	....	
26, 310	105, 240	....	....	....	....	Tensile strength,

General summary.

Tensile strength per square inch of original section	pounds..	105, 240
Elastic limit per square inch of original section	do ..	59, 000
Elongation per inch after rupture	inch..	0. 1100
Elongation per inch under strain at elastic limit	do...	.002400
Reduction in diameter at point of rupture	do...	.044
Reduction in area after rupture, per centum of original section		15. 0
Position of rupture		1".20 from the neck
Character of broken surface		granular, radiating from a dull spot at the circumference
Elongation of inch sections		".09, ".11, ".15*, ".09

No. 3748.

Marks, $^{12\,M\,R_1\,T\,H}_{T_2\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000175	.000175	0.	....	
2, 500	10, 000	.000350	.000175	0.	....	
3, 750	15, 000	.000525	.000175	0.	....	
5, 000	20, 000	.000700	.000175	0.	....	
6, 250	25, 000	.000900	.000200	0.	....	
7, 500	30, 000	.001125	.000225	0.	....	
8, 750	35, 000	.001275	.000150	0.	....	
10, 000	40, 000	.001425	.000150	.000025	.000025	
11, 250	45, 000	.001550	.000125	....	....	
12, 500	50, 000	.001725	.000175	....	....	
12, 750	51, 000	.001750	.000025	....	....	
13, 000	52, 000	.001775	.000025	....	....	
13, 250	53, 000	.001825	.000050	....	....	
13, 500	54, 000	.001875	.000050	....	....	
13, 750	55, 000	.001900	.000025	....	....	
14, 000	56, 000	.001950	.000050	....	....	
14, 250	57, 000	.002025	.000075	....	....	Elastic limit.
14. 500	58, 000	,002150	.000125	....	....	
14, 750	59, 000	.002225	.000075	....	....	
15, 000	60, 000	.002450	.000225	....	....	
15, 250	61, 000	.003000	.000550	....	....	
15, 500	62, 000	.003500	.000500	....	....	
16, 000	64, 000	.005000	.001500	....	....	
16, 500	66, 000	.006750	.001750	....	....	
17, 000	68, 000	.008000	.001250	....	....	
17, 500	70, 000	.009700	.001700	....	....	
18, 000	72,000	.010950	.001250	....	....	
18, 500	74, 000	.012475	.001525	....	....	
19, 000	76, 000	.013925	.001450	....	....	
19, 500	78, 000	.015575	.001650	....	....	
20, 000	80, 000	.017175	.001600	....	....	
20, 500	82, 000	.018675	.001500	....	....	
21, 000	84, 000	.020750	.002075	....	....	
21, 500	86, 000	.022925	.002175	....	....	
22, 000	88, 000	.025125	.002200	....	....	
22, 500	90, 000	.027125	.002000	....	....	
23, 000	92, 000	.029500	.002375	....	....	
23, 500	94, 000	.032250	.002750	....	....	
24, 000	96, 000	.035250	.003000	....	....	
24, 500	98, 000	.038875	.003625	....	....	
25, 000	100, 000	.043000	.004125	....	....	
25, 500	102, 000	.047750	.004750	....	....	
26, 000	104, 000	.053250	.005500	....	....	
26, 500	106, 000	.0650	.011750	....	....	
27, 000	108, 000	.0750	.0100	....	....	
27, 500	110, 000	.1000	.0250	....	....	
27, 510	110, 040	.1100	.0100	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	110, 040
Elastic limit per square inch of original section	do	57, 000
Elongation per inch after rupture	inch	0. 1325
Elongation per inch under strain at elastic limit	do	.002025
Reduction in diameter at point of rupture	do	.074
Reduction in area after rupture, per centum of original section		24. 6
Position of rupture		1″. 10 from the neck
Character of broken surface		granular, radiating from a dull spot at the circumference
Elongation of inch sections		″. 19*, ″. 16, ″. 10, ″. 88

No. 3749.

Marks, $\substack{12\,\mathrm{M}\,\mathrm{R}_1\,\mathrm{T}\,\mathrm{H} \\ \mathrm{T}_3\,\mathrm{O}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000200	.000200	0.	....	
2, 500	10, 000	.000425	.000225	0.	....	
3, 750	15, 000	.000650	.000225	0.	....	
5, 000	20, 000	.000800	.000150	0.	....	
6, 250	25, 000	.000950	.000150	.000025	.000025	
7, 500	30, 000	.001100	.000150	.000025	0.	
8, 750	35, 000	.001275	.000175	.000025	0.	
10, 000	40, 000	.001500	.000225	.000025	0.	
11, 250	45, 000	.001675	.000175	....	....	
12, 500	50, 000	.001825	.000150	....	....	
13, 750	55, 000	.002000	.000175	....	....	
14, 000	56, 000	.002050	.000050	....	....	
14, 250	57, 000	.002125	.000075	....	....	
14, 500	58, 000	.002175	.000050	....	....	
14, 750	59, 000	.002200	.000025	....	....	
15, 000	60, 000	.002275	.000075	....	....	
15, 250	61, 000	.002350	.000075	....	....	Elastic limit.
15, 500	62, 000	.002525	.000175	....	....	
15, 750	63, 000	.002775	.000250	....	....	
16, 000	64, 000	.003450	.000675	....	....	
16, 500	66. 000	.005125	.001675	....	....	
17, 000	68, 000	.006875	.001750	....	....	
17, 500	70, 000	.008500	.001625	....	....	
18, 000	72, 000	.010250	.001750	....	....	
18, 500	74, 000	.011700	.001450	....	....	
19, 000	76, 000	.013300	.001600	....	....	
19, 500	78, 000	.015025	.001725	....	....	
20, 000	80, 000	.016875	.001850	....	....	
20, 500	82, 000	.018675	.001800	....	....	
21, 000	84, 000	.020875	.002200	....	....	
21, 500	86, 000	.022900	.002025	....	....	
22, 000	88, 000	.024625	.001725	....	....	
22, 500	90, 000	.027000	.002375	....	....	
23, 000	92, 000	.029650	.002650	....	....	
23, 500	94, 000	.032400	.002750	....	....	
24. 000	96, 000	.035650	.003250	....	....	
24, 500	98, 000	.039250	.003600	....	....	
25, 000	100, 000	.043550	.004300	....	....	
25, 500	102, 000	.049375	.005825	....	....	
26, 000	104, 000	.0575	.008125	....	....	
26, 500	106, 000	.0675	.0100	....	....	
27, 000	108, 000	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108, 000
Elastic limit per square inch of original section	do ..	61, 000
Elongation per inch after rupture	inch..	0. 0825
Elongation per inch under strain at elastic limit	do..	.002350
Reduction in diameter at point of rupture	do...	.034
Reduction in area after rupture, per centum of original section		11. 8
Position of rupture		1″.20 from the neck
Character of broken surface		granular, radiating from a dull spot near the circumference
Elongation of inch sections		″.08, ″.10*, ″.08, ″.07

No. 3765.

Marks, $\underset{T_4\ I}{12\ M\ R_1\ T\ H}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000075	.000075	0.		
2, 500	10, 000	.000225	.000150			
5, 000	20, 000	.000575	.000350			
7, 500	30, 000	.000950	.000375			
10, 000	40, 000	.001250	.000300			
11, 250	45, 000	.001475	.000225	—.000025	—.000025	
12, 000	48, 000	.001575	.000100	0.	.000025	
12, 250	49, 000	.001625	.000050			
12, 500	50, 000	.001700	.000075			
12, 750	51, 000	.001725	.000025			Elastic limit.
13, 000	52, 000	.002050	.000325			
13, 250	53, 000	.002475	.000425			
13, 500	54, 000	.003500	.001025			
14, 000	56, 000	.005900	.002400			
14, 500	58, 000	.008150	.002250			
15, 000	60, 000	.009775	.001625			
15, 500	62, 000	.011275	.001500			
16, 000	64, 000	.013200	.001925			
23, 730	94, 920					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94, 920
Elastic limit per square inch of original section	do...	51, 000
Elongation per inch after rupture	inch..	0.1675
Elongation per inch under strain at elastic limit	do...	.001725
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6

Position of rupture .... 2″ from the neck
Character of broken surface, granular; silky spot at the circumference. Opened cracks in surface of stem.
Elongation of inch sections .... ″.14, ″.26*, ″.16, ″.11

HOOP A$_3$.

No. 3737.

Marks, $\genfrac{}{}{0pt}{}{12\,\mathrm{M\,R_1\,A_3}}{\mathrm{T_1\,O}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	....	....	
2,500	10,000	.000300	.000175	....	....	
3,750	15,000	.000500	.000200	....	....	
5,000	20,000	.000700	.000200	....	....	
6,250	25,000	.000875	.000175	....	....	
7,500	30,000	.001025	.000150	....	....	
8,750	35,000	.001200	.000175	....	....	
10,000	40,000	.001400	.000200	....	....	
11,250	45,000	.001575	.000175	....	....	
12,500	50,000	.001750	.000150	....	....	
13,750	55,000	.001950	.000200	....	....	Elastic limit.
14,000	56,000	.003500	.001550	....	....	
14,250	57,000	.005625	.002125	....	....	
14,500	58,000	.006875	.001250	....	....	
15,000	60,000	.008375	.001500	....	....	
15,500	62,000	.009800	.001425	....	....	
16,000	64,000	.011125	.001325	....	....	
16,500	66,000	.012925	.001800	....	....	
17,000	68,000	.014625	.001700	....	....	
17,500	70,000	.016250	.001625	....	....	
18,000	72,000	.018500	.002250	....	....	
18,500	74,000	.020425	.001925	....	....	
19,000	76,000	.022500	.002075	....	....	
19,500	78,000	.024750	.002250	....	....	
20,000	80,000	.027250	.002500	....	....	
20,500	82,000	.029500	.002250	....	....	
21,000	84,000	.032500	.003000	....	....	
21,500	86,000	.035875	.003375	....	....	
22,000	88,000	.039750	.003875	....	....	
22,500	90,000	.043750	.004000	....	....	
23,000	92,000	.050000	.006250	....	....	
23,500	94,000	.059875	.006875	....	....	
24,000	96,000	.066250	.009375	....	....	
24,500	98,000	.0800	.013750	....	....	
25,000	100,000	.1300	0500	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	100,000
Elastic limit per square inch of original section ....do...	55,000
Elongation per inch after rupture ....inch..	0.1850
Elongation per inch under strain at elastic limit ....do...	.001950
Reduction in diameter at point of rupture ....do...	.184
Reduction in area after rupture, per centum of original section	54.6
Position of rupture	1″.40 from the neck
Character of broken surface	fine, silky
Elongation of inch sections	″.10, ″.13, ″.31*, ″.20

No. 3738.

Marks, $\underset{T_2\,I}{^{12}M\,R_1\,A_3}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000125	.000125	0.	....	
2, 500	10, 000	.000300	.000175	0.	....	
3, 750	15, 000	.000500	.000200	0.	....	
5, 000	20, 000	.000650	.000150	0.	....	
6, 250	25, 000	.000825	.000175	0.	....	
7, 500	30, 000	.001000	.000175	0.	....	
8, 750	35, 000	.001175	.000175	0.	....	
10, 000	40, 000	.001325	.000150	0.	....	
11, 250	45, 000	.001500	.000175	....	....	
12, 500	50, 000	.001675	.000175	....	....	
13, 750	55, 000	.001850	.000175	....	....	
14, 000	56, 000	.001925	.000075	....	....	Elastic limit.
14, 250	57, 000	.002125	.000200	....	....	
14, 500	58, 000	.003625	.001500	....	....	
14, 750	59, 000	.004750	.001125	....	....	
15, 000	60, 000	.005700	.000950	....	....	
15, 500	62, 000	.007500	.001800	....	....	
16, 000	64, 000	.009000	,001500	....	....	
16, 500	66, 000	.010875	.001875	....	....	
17, 000	68, 000	.012500	.001625	....	....	
17, 500	70, 000	.014250	.001750	....	....	
18, 000	72, 000	.016250	.002000	....	....	
18, 500	74, 000	.018250	.002000	....	....	
19, 000	76, 000	.020250	.002000	....	....	
19, 500	78, 000	.022500	.002250	....	....	
20, 000	80, 000	.024625	.002125	....	....	
20, 500	82, 000	.027250	.002625	....	....	
21, 000	84, 000	.030000	.002750	....	....	
21, 500	86, 000	.033250	.003250	....	....	
22, 000	88, 000	.036750	.003500	....	....	
22, 500	90, 000	.041000	.004250	....	....	
23, 000	92, 000	.046250	.005250	....	....	
23, 500	94, 000	.053000	.006750	....	....	
24, 000	96, 000	.061625	.008625	....	....	
24, 500	98, 000	.0775	.015875	....	....	
25, 000	100, 000	.1050	.0275	....	....	
25, 020	100, 080	.1275	.0225	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	100, 080
Elastic limit per square inch of original section	do...	56, 000
Elongation per inch after rupture	inch..	0. 1925
Elongation per inch under strain at elastic limit	do...	.001925
Reduction in diameter at point of rupture	do...	.174
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		1″. 75 from the neck
Character of broken surface		fine, silky
Elongation of inch sections		″. 12, ″. 40*, ″15, ″10

No. 3739.

Marks, $12\,\frac{M\ R_1\ A_3}{T_3\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	....	
2,500	10,000	.000300	.000150	0.	....	
3,750	15,000	.000500	.000200	0.	....	
5,000	20,000	.000675	.000175	0.	....	
6,250	25,000	.000875	.000200	0.	....	
7,500	30,000	.001025	.000150	0.	....	
8,750	35,000	.001200	.000175	0.	....	
10,000	40,000	.001350	.000150	0.	....	
11,250	45,000	.001525	.000175	....	....	
12,500	50,000	.001700	.000175	....	....	
13,000	52,000	.001775	.000075	....	....	Elastic limit.
13,250	53,000	.002275	.000500	....	....	
13,500	54,000	.003050	.000775	....	....	
13,750	55,000	.004200	.001150	....	....	
14,000	56,000	.005125	.000925	....	....	
14,500	58,000	.006625	.001500	....	....	
15,000	60,000	.008500	.001875	....	....	
15,500	62,000	.009875	.001375	....	....	
16,000	64,500	.011250	.001375	....	....	
16,500	66,000	.012925	.001675	....	....	
17,000	68,000	.014500	.001575	....	....	
17,500	70,000	.016200	.001700	....	....	
18,000	72,000	.017750	.001550	....	....	
18,500	74,000	.019300	.001550	....	....	
19,000	76,000	.021174	.001875	....	....	
19,500	78,000	.023250	.002075	....	....	
20,000	80,000	.025500	.002250	....	....	
20,500	82,000	.027800	.002300	....	....	
21,000	84,000	.030250	.002450	....	....	
21,500	86,000	.033375	.003125	....	....	
22,000	88,000	.036500	.003125	....	....	
22,500	90,000	.040625	.004125	....	....	
23,000	92,000	.045000	.004375	....	....	
23,500	94,000	.050500	.005500	....	....	
24,000	96,000	.0575	.0070	....	....	
24,500	98,000	.0675	.0100	....	....	
25,000	100,000	.0825	.0150	....	....	
25,370	101,480	.1225	.0400	....	....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds	101,480
Elastic limit, per square inch of original section	do	52,000
Elongation per inch after rupture	inch	0.1700
Elongation per inch under strain at elastic limit	do	.001775
Reduction in diameter at point of rupture	do	.134
Reduction in area after rupture, per cent. of original section		41.9
Position of rupture		1″.15 from neck
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		″.25*, ″.22, ″.11, ″.10

Hoop A_4.

No. 3726.

Marks, $12\ M\ \underset{T_1\ O}{R_1}\ A_4$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000175	.000175	....	....	
2, 500	10, 000	.000375	.000200	....	....	
3, 750	15, 000	.000525	.000150	....	....	
5, 000	20, 000	.000700	.000175	....	....	
6, 250	25, 000	.000825	.000125	....	....	
7, 500	30, 000	.001000	.000175	....	....	
8, 750	35, 000	.001150	.000150	....	....	
10, 000	40, 000	.001300	.000150	....	....	
11, 250	45, 000	.001425	.000125	....	....	
12, 500	50, 000	.001625	.000200	....	....	
12, 750	51, 000	.001675	.000050	....	....	
13, 000	52, 000	.001700	.000025	....	....	
13, 250	53, 000	.001750	.000050	....	....	
13, 500	54, 000	.001800	.000050	....	....	
13, 750	55, 000	.001850	.000050	....	....	Elastic limit.
14, 000	56, 000	.002175	.000325	....	....	
14, 250	57, 000	.002400	.000225	....	....	
14, 500	58, 000	.003750	.001350	....	....	
15, 000	60, 000	.006625	.002875	....	....	
15, 500	62, 000	.007925	.001300	....	....	
16, 000	64, 000	.009500	.001575	....	....	
16, 500	66, 000	.011125	.001625	....	....	
17, 000	68, 000	.012800	.001675	....	....	
17, 500	70, 000	.014500	.001700	....	....	
18, 000	72, 000	.016250	.001750	....	....	
18, 500	74, 000	.018000	.001750	....	....	
19, 000	76, 000	.020000	.002000	....	....	
19, 500	78, 000	.022000	.002000	....	....	
20, 000	80, 000	.024375	.002375	....	....	
20, 500	82, 000	.026750	.002375	....	....	
21, 000	84, 000	.029500	.002750	....	....	
21, 500	86, 000	.032500	.003000	....	....	
22, 000	88, 000	.036250	.003750	....	....	
22, 500	90, 000	.0400	.003750	....	....	
23, 000	92, 000	.0450	.0050	....	....	
23, 500	94, 000	.0500	.0050	....	....	
24, 000	96, 000	.0550	.0050	....	....	
24, 500	98, 000	.0700	.0150	....	....	
25, 000	100, 000	.0875	.0175	....	....	
25, 320	101, 280	.1250	.0375	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101, 280
Elastic limit per square inch of original section	do...	55, 005
Elongation per inch after rupture	inch..	0. 1970
Elongation per inch under strain at elastic limit	do...	. 001850
Reduction in diameter at point of rupture	do...	. 184
Reduction in area after rupture, per centum of original section		54. 6
Position of rupture		1″.35 from the neck
Character of broken surface		fine, silky
Elongation of inch sections		″.10, ″.14, ″.36*, ″.19

No. 3727.

Marks, $^{12}\genfrac{}{}{0pt}{}{\mathrm{M\,R_1\,A_4}}{\mathrm{T_2\,I}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150			
2, 500	10, 000	.000300	.000150			
3, 750	15, 000	.000475	.000175			
5, 000	20, 000	.000675	.000200			
6, 250	25, 000	.000800	.000125			
7, 500	30, 000	.000950	.000150			
8, 750	35, 000	.001150	.000200			
10, 000	40, 000	.001300	.000150			
11, 250	45, 000	.001450	.000150			
12, 500	50, 000	.001650	.000200			
12, 750	51, 000	.001700	.000050			
13, 000	52, 000	.001725	.000025			
13, 250	53, 000	.001775	.000050			
13, 500	54, 000	.001800	.000025			
13, 750	55, 000	.001825	.000025			
14, 000	56, 000	.001875	.000050			
14, 250	57, 000	.001925	.000050			
14, 500	58, 000	.001975	.000050			
14, 750	59, 000	.002000	.000025			Elastic limit.
15, 000	60, 000	.003375	.001375			
15, 500	62, 000	.006875	.003500			
16, 000	64, 000	.008500	.001625			
16, 500	66, 000	.010000	.001500			
17, 000	68, 000	.011500	.001500			
17, 500	70, 000	.013500	.002000			
18, 000	72, 000	.015000	.001500			
18. 500	74, 000	.016500	.001500			
19, 000	76, 000	.018500	.002000			
19, 500	78, 000	.020750	.002250			
20, 000	80, 000	.023125	.002375			
20, 500	82, 000	.025750	.002625			
21, 000	84, 000	.028250	.002500			
21, 500	86, 000	.031000	.002750			
22, 000	88, 000	.034375	.003375			
22, 500	90, 000	.038500	.004125			
23, 000	92, 000	.042500	.004000			
23, 500	94, 000	.048750	.006250			
24, 000	96, 000	.056000	.007250			
24, 500	98, 000	.0675	.0115			
25, 000	100, 000	.0825	.0150			
25. 370	101, 480	.1175	.0350			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	101, 480
Elastic limit per square inch of original section	do	59, 000
Elongation per inch after rupture	inch	0. 1850
Elongation per inch under strain at elastic limit	do	.002000
Reduction in diameter at point of rupture	do	.174
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		1″.10 from the neck
Character of broken surface		fine, silky
Elongation of inch sections		″.33*, ″.21, ″.11, ″.09

No. 3728.

Marks, $^{12}\,\overset{\text{M R}_1\text{ A}_4}{\text{T}_3\text{ M}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	....	....	
2,500	10,000	.000325	.000175	....	....	
3,750	15,000	.000475	.000150	....	....	
5,000	20,000	.000675	.000200	....	....	
6,250	25,000	.000800	.000125	....	....	
7,500	30,000	.000975	.000175	....	....	
8,750	35,000	.001150	.000175	....	....	
10,000	40,000	.001300	.000150	....	....	
11,250	45,000	.001475	.000175	....	....	
12,500	50,000	.001650	.000175	....	....	
12,750	51,000	.001700	.000050	....	....	
13,000	52,000	.001750	.000050	....	....	Elastic limit.
13,250	53,000	.003125	.001375	....	....	
13,500	54,000	.006000	.002825	....	....	
13.750	55,000	.006750	.000750	....	....	
14,000	56,000	.007375	.000625	....	....	
14,500	58,000	.008750	.001375	....	....	
15,000	60,000	.010250	.001500	....	....	
15,500	62,000	.011750	.001500	....	....	
16,000	64,000	.013425	.001675	....	....	
16,500	66,000	.015175	.001750	....	....	
17,000	68,000	.017000	.001825	....	....	
17,500	70,000	.019000	.002000	....	....	
18,000	72,000	.021025	.002025	....	....	
18,500	74,000	.023250	.002225	....	....	
19,000	76,000	.025625	.002375	....	....	
19,500	78,000	.028000	.002375	....	....	
20,000	80,000	.031000	.003000	....	....	
20,500	82,000	.034500	.003500	....	....	
21,000	84,000	.0375	.0030	....	....	
21,500	86,000	.0425	.0050	....	....	
22,000	88,000	.0475	.0050	....	....	
22,500	90,000	.0525	.0050	....	....	
23,000	92,000	.0600	.0075	....	....	
23,500	94,000	.0750	.0150	....	....	
24,000	96,000	.1000	.0250	....	....	
24,260	97,040	.1325	.0325	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds..	97,040
Elastic limit per square inch of original section..........do...	52,000
Elongation per inch after rupture..........inch..	0.2075
Elongation per inch under strain at elastic limit..........do...	.001750
Reduction in diameter at point of rupture..........do...	.174
Reduction in area after rupture, per centum of original section..........	52.2
Position of rupture..........	1″.20 from the neck
Character of broken surface..........	fine, silky
Elongation of inch sections..........	″.34*, ″.25, ″.13, ″.11

HOOP A_5.

No. 3729.

Marks, $^{12}\,\overset{M\,R_1\,A_5}{T_1\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000125	.000125	....	....	
2, 500	10, 000	.000300	.000175	....	....	
3, 750	15, 000	.000475	.000175	....	....	
5, 000	20, 000	.000675	.000200	....	....	
6, 250	25, 000	.000825	.000150	....	....	
7, 500	30, 000	.001000	.000175	....	....	
8, 750	35, 000	.001175	.000175	....	....	
10, 000	40, 000	.001325	.000150	....	....	
11, 250	45, 000	.000500	.000175	....	....	
12, 500	50, 000	.001650	.000150	....	....	
12, 750	51, 000	.001700	.000050	....	....	
13, 000	52, 000	.001750	.000050	....	....	
13, 250	53, 000	.001800	.000050	....	....	Elastic limit.
13, 500	54, 000	.003750	.001950	....	....	
13, 750	55, 000	.004750	.001000	....	....	
14, 000	56, 000	.005750	.001000	....	....	
14, 500	58, 000	.007500	.001750	....	....	
15, 000	60, 000	.008950	.001450	....	....	
15, 500	62, 000	.010500	.001550	....	....	
16, 000	64, 000	.012000	.001500	....	....	
16, 500	66, 000	.013675	.001675	....	....	
17, 000	68, 000	.015425	.001750	....	....	
17, 500	70, 000	.017250	.001825	....	....	
18, 000	72, 000	.019000	.001750	....	....	
18, 500	74, 000	.021250	.002250	....	....	
19, 000	76, 000	.023500	.002250	....	....	
19, 500	78, 000	.025875	.002375	....	....	
20, 000	80. 000	.028375	.002500	....	....	
20, 500	82, 000	.034275	.002900	....	....	
21, 000	84, 000	.034500	.003225	....	....	
21, 500	86, 000	.038500	.004000	....	....	
22, 000	88, 000	.0450	.0065	....	....	
22, 500	90, 000	.0500	.0050	....	....	
23, 000	92, 000	.0550	.0050	....	....	
23, 500	94, 000	.0650	.0100	....	....	
24, 000	96, 000	.0775	.0125	....	....	
24, 500	98, 000	.1125	.0350	....	....	
24, 530	98, 120	.1275	.0150	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	98, 120
Elastic limit per square inch of original section	do...	53, 000
Elongation per inch after rupture	inch..	0 2150
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.174
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		2″ from the neck
Character of broken surface		fine, silky
Elongation of inch sections		″.13, ″.44*, ″.17, ″.12

No. 3730.

Marks, $^{12\,M\,R_1\,A_5}_{\quad T_2\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.		
2,500	10,000	.000250	.000125	0.		
3,750	15,000	.000425	.000175	0.		
5,000	20,000	.000600	.000175	0.		
6,250	25,000	.000750	.000150	0.		
7,500	30,000	.000925	.000175	0.		
8,750	35,000	.001075	.000150	0.		
10,000	40,000	.001250	.000175	0.		
11,250	45,000	.001425	.000175			
12,500	50,000	.001600	.000175			
13,000	52,000	.001700	.000100			
13,250	53,000	.001750	.000050			
13,500	54,000	.001775	.000025			
13,750	55,000	.001800	.000025			Elastic limit.
14,000	56,000	.001925	.000125			
14,250	57,000	.002250	.000325			
14,500	58,000	.003625	.001375			
15,000	60,000	.005875	.002250			
15,500	62,000	.007925	.002050			
16,000	64,000	.009625	.001700			
16,500	66,000	.011000	.001375			
17,000	68,000	.012750	.001750			
17,500	70,000	.014375	.001625			
18,000	72,000	.016250	.001875			
18,500	74,000	.018250	.002000			
19,000	76,000	.020425	.002175			
19,500	78,000	.022675	.002250			
20,000	80,000	.024875	.002200			
20,500	82,000	.027750	.002875			
21,000	84,000	.031125	.003375			
21,500	86,000	.034200	.003075			
22,000	88,000	.038125	.003925			
22,500	90,000	.042775	.004650			
23,000	92,000	.0500	.007225			
23,500	94,000	.0550	.0050			
24,000	96,000	.0675	.0125			
24,500	98,000	.0850	.0175			
24,910	99,640	.1300	.0450			Tensile strength.

General summary.

Tensile strength per square inch of original section........pounds..	99,640
Elastic limit per square inch of original section........do...	55,000
Elongation per inch after rupture........inch..	0.1900
Elongation per inch under strain at elastic limit........do...	.001800
Reduction in diameter at point of rupture........do...	.174
Reduction in area after rupture, per centum of original section........	52.2
Position of rupture........	1″.29 from the neck
Character of broken surface........	fine, silky
Elongation of inch sections........	″.09, ″.12, ″.26, *″.29*

No. 3731.

Marks, $^{12}\genfrac{}{}{0pt}{}{M\ R_1\ A_5}{T_3\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	....	
2,500	10,000	.000225	.000150	0.	....	
3,750	15,000	.000425	.000150	0.	....	
5,000	20,000	.000575	.000150	0.	....	
6,250	25,000	.000750	.000175	0.	....	
7,500	30,000	.000950	.000200	0.	....	
8,750	35,000	.001100	.000150	0.	....	
10,000	40,000	.001250	.000150	0.	....	
11,250	45,000	.001450	.000200	....	....	
12,500	50,000	.001650	.000200	....	....	Elastic limit.
12,750	51,000	.003625	.001975	....	....	
13,000	52,000	.004825	.001200	....	....	
13,250	53,000	.005450	.000625	....	....	
13,500	54,000	.006375	.000925	....	....	
14,000	56,000	.007925	.001550	....	....	
14,500	58,000	.009500	.001575	....	....	
15,000	60,000	.011125	.001625	....	....	
15,500	62,000	.012550	.001425	....	....	
16,000	64,000	.014200	.001650	....	....	
16,500	66,000	.016000	.001800	....	....	
17,000	68,000	.018000	.002000	....	....	
17,500	70,000	.019625	.001625	....	....	
18,000	72,000	.022250	.002625	....	....	
18,500	74,000	.024625	.002375	....	....	
19,000	76,000	.027000	.002375	....	....	
19,500	78,000	.029875	.002875	....	....	
20,000	80,000	.033000	.003125	....	....	
20,500	82,000	.036375	.003375	....	....	
21,000	84,000	.040750	.004375	....	....	
21,500	86,000	.046250	.005500	....	....	
22,000	88,000	.0525	.006250	....	....	
22,500	90,000	.0600	.0075	....	....	
23,000	92,000	.0725	.0125	....	....	
23,500	94,000	.0900	.0175	....	....	
23,900	95,600	.1350	.0450	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds ..	95,600
Elastic limit per square inch of original section .... do ...	50,000
Elongation per inch after rupture .... inch ..	0.1950
Elongation per inch under strain at elastic limit .... do ...	.001650
Reduction in diameter at point of rupture .... do ...	.174
Reduction in area after rupture, per centum of original section	52.2
Position of rupture	1″.15 from the neck
Character of broken surface	fine, silky
Elongation of inch sections	″.35*, ″.20, ″.12, ″.11.

HOOP A_6.

No. 3732.

Marks, $^{12}\genfrac{}{}{0pt}{}{M\ R_1\ A_6}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	....	
2,500	10,000	.000300	.000175	0.	....	
3,750	15,000	.000475	.000175	0.	....	
5,000	20,000	.000650	.000175	0.	....	
6,250	25,000	.000775	.000125	0.	....	
7,500	30,000	.000950	.000175	0.	....	
8,750	35,000	.001125	.000175	0.	....	
10,000	40,000	.001275	.000150	0.	....	
11,250	45,000	,001450	.000175	....	....	
12,500	50,000	.001675	.000225	....	....	
13,750	55,000	.001850	.000175	....	....	
14,000	56,000	.001900	.000050	....	....	
14,250	57,000	.001950	.000050	....	....	
14,500	58,000	.002025	.000075	....	....	
14,750	59,000	.002100	.000075	....	....	Elastic limit, not well defined.
15,000	60,000	.003375	.001275	....	....	
15,500	62,000	.006125	.002750	....	....	
16,000	64,000	.007750	.001625	....	....	
16,500	66,000	.010250	.002500	....	....	
17,000	68,000	.012250	.002000	....	....	
17,500	70,000	.013550	.001300	....	....	
18,000	72,000	.015375	.001825	....	....	
18,500	74,000	.017125	.001750	....	....	
19,000	76,000	.019375	.002250	....	....	
19,500	78,000	.021375	.002000	....	....	
20,000	80,000	.023750	.002375	....	....	
20,500	82,000	.026500	.002750	....	....	
21,000	84,000	.029500	.003000	....	....	
21,500	86,000	.032375	.002875	....	....	
22,000	88,000	.036000	.003625	....	....	
22,500	90,000	.040000	.004000	....	....	
23,000	92,000	.045500	.005500	....	....	
23,500	94,000	.051625	.006125	....	....	
24,000	96,000	.0600	.008375	....	....	
24,500	98,000	.0700	.0100	....	....	
25,000	100,000	.1000	.0300	....	....	
25,120	100,480	.1250	.0250	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	100,480
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	0.1925
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		1″.70 from the neck
Character of broken surface		fine, silky
Elongation of inch sections		″.13, ″.41*, ″.13, ″.10

No. 3733.

Marks, $\overset{12\ M\ R_1\ A_6}{T_2\ I}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	...	
2,500	10,000	.000325	.000175	0.	...	
3,750	15,000	.000500	.000175	0.	...	
5,000	20,000	.000725	.000225	0.	...	
6,250	25,000	.000900	.000175	0.	...	
7,500	30,000	.001050	.000150	0.	...	
8,750	35,000	.001250	.000200	0.	...	
10,000	40,000	.001450	.000200	0.	...	
11,250	45,000	.001600	.000150	...	...	
12,500	50,000	.001750	.000150	...	...	
13,750	55,000	.002025	.000275	...	...	
14,000	56,000	.002050	.000025	...	...	
14,250	57,000	.002075	.000025	...	...	
14,500	58,000	.002125	.000050	...	...	
14,750	59,000	.002175	.000050	...	...	
15,000	60,000	.002225	.000050	...	...	
15,250	61,000	.002275	.000050	...	...	Elastic limit.
15,500	62,000	.002500	.000225	...	...	
15,750	63,000	.003625	.001125	...	...	
16,000	64,000	.005075	.001450	...	...	
16,500	66,000	.007375	.002300	...	...	
17,000	68,600	.010000	.002625	...	...	
17,500	70,000	.011750	.001750	...	...	
18,000	72,000	.013500	.001750	...	...	
18,500	74,000	.015250	.001750	...	...	
19,000	76,000	.017000	.001750	...	...	
19,500	78,000	.019125	.002125	...	...	
20,000	80,000	.021250	.002125	...	...	
20,500	82,000	.023500	.002250	...	...	
21,000	84,000	.026000	.002500	...	...	
21,500	86,000	.028800	.002800	...	...	
22,000	88,000	.032125	.003325	...	...	
22,500	90,000	.035500	.003375	...	...	
23,000	92,000	.040000	.004500	...	...	
23,500	94,000	.044500	.004500	...	...	
24,000	96,000	.051000	.006500	...	...	
24,500	98,000	.059375	.008375	...	...	
25,000	100,000	.0725	.013125	...	...	
25,500	102,000	.0975	.0250	...	...	
25,520	102,080	.1325	.0350	...	...	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102,080
Elastic limit per square inch of original section	do...	61,000
Elongation per inch after rupture	inch..	0.1925
Elongation per inch under strain at elastic limit	do...	.002275
Reduction in diameter at point of rupture	do...	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		2''.10 from the neck
Character of broken surface		fine, silky
Elongation of inch sections		''.11, ''.38*, ''.17, ''.11

No. 3734.

Marks, $^{12}\,\substack{\text{M R}_1\ \text{A}_6 \\ \text{T}_3\ \text{M}}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000125	.000125	0.		
2, 500	10, 000	.000275	.000150	0.		
3, 750	15, 000	.000450	.000175	0.		
5, 000	20, 000	.000650	.000200	0.		
6, 250	25, 000	.000775	.000125	0.		
7, 500	30, 000	.000975	.000200	0.		
8, 750	35, 000	.001150	.000175	0.		
10, 000	40, 000	.001275	.000125	0.		
11, 250	45, 000	.001450	.000175			
12, 500	50, 000	.001575	.000125			
13, 750	55, 000	.001750	.000175			
14, 000	56, 000	.001775	.000025			
14, 250	57, 000	.001825	.000050			
14, 500	58, 000	.001900	.000075			Elastic limit.
14, 750	59, 000	.002025	.000125			
15, 000	60, 000	.005300	.003275			
15, 250	61, 000	.005875	.000575			
15, 500	62, 000	.006625	.000750			
16, 000	64, 000	.008550	.001925			
16, 500	66, 000	.010250	.001700			
17, 000	68, 000	.011750	.001500			
17, 500	70, 000	.013375	.001625			
18, 000	72, 000	.015250	.001875			
18, 500	74, 000	.017125	.001875			
19, 000	76, 000	.019250	.002125			
19, 500	78, 000	.021175	.001925			
20, 000	80, 000	.023375	.002200			
20, 500	82, 000	.025750	.002375			
21, 000	84, 000	.028250	.002500			
21, 500	86, 000	.031175	.002925			
22, 000	88, 000	.034250	.003075			
22, 500	90, 000	.038250	.004000			
23, 000	92, 000	.042500	.004250			
23, 500	94, 000	.047500	.005000			
24, 000	96, 000	.054000	.006500			
24, 500	98, 000	.0625	.0085			
25, 000	100, 000	.0750	.0125			
25, 500	102, 000	.1200	.0450			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102, 000
Elastic limit per square inch of original section	do...	58, 000
Elongation per inch after rupture	inch..	0. 1900
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per centum of original section		49. 7
Position of rupture		1''.50 from the neck
Character of broken surface		fine silky
Elongation of inch sections		''14, ''.38*, ''.14, ''.10

HOOP A_7.

No. 3740.

Marks, $\genfrac{}{}{0pt}{}{12\ M\ R_1\ A_7}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	....	
2,500	10,000	.000300	.000175	0.	....	
3,750	15,000	.000475	.000175	0.	....	
5,000	20,000	.000650	.000175	0.	....	
6,250	25,000	.000825	.000175	0.	....	
7,500	30,000	.001000	.000175	0.	....	
8,750	35,000	.001175	.000175	0.	....	
10,000	40,000	.001375	.000200	0.	....	
11,250	45,000	.001525	.000150	....	....	
12,500	50,000	.001725	.000200	....	....	
13,750	55,000	.001900	.000175	....	....	
14,000	56,000	.001950	.000050	....	....	
14,250	57,000	.002000	.000050	....	....	
14,500	58,000	.002025	.000025	....	....	
14,750	59,000	.002075	.000050	....	....	
15,000	60,000	.002125	.000050	....	....	Elastic limit.
15,250	61,000	.002200	.000075	....	....	
15,500	62,000	.002325	.000125	....	....	
15,750	63,000	.003000	.000675	....	....	
16,000	64,000	.004175	.001175	....	....	
16,500	66,000	.006450	.002275	....	....	
17,000	68,000	.008175	.001725	....	....	
17,500	70,000	.009700	.001525	....	....	
18,000	72,000	.011375	.001675	....	....	
18,500	74,000	.013000	.001625	....	....	
19,000	76,000	.014750	.001750	....	....	
19,500	78,000	.016700	.001950	....	....	
20,000	80,000	.018750	.002050	....	....	
20,500	82,000	.020700	.001950	....	....	
21,000	84,000	.023000	.002300	....	....	
21,500	86,000	.025125	.002125	....	....	
22,000	88,000	.027750	.002625	....	....	
22,500	90,000	.030000	.002250	....	....	
23,000	92,000	.033000	.003000	....	....	
23,500	94,000	.036200	.003200	....	....	
24,000	96,000	.04250	.00630	....	....	
24,500	98,000	.04625	.00425	....	....	
25,000	100,000	.05125	.00500	....	....	
25,500	102,000	.05750	.00625	....	....	
26,000	104,000	.0725	.0150	....	....	
26,500	106,000	.1000	.0275	....	....	
26,510	106,040	.1175	.0175	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	106,040
Elastic limit per square inch of original section	do...	60,000
Elongation per inch after rupture	inch..	0.1875
Elongation per inch under strain at elastic limit	do...	.002125
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		2″.25 from the neck
Character of broken surface		silky
Elongation of inch sections		″.11, ″.37*, ″.18, ″.09

No. 3741.

Marks, $\begin{array}{l} 12\,M\,R_1\,A_7 \\ \quad\;\; T_2\;\;\, I \end{array}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000125	.000125	....	....	
2, 500	10, 000	.000300	.000175	....	....	
3, 750	15, 000	.000475	.000175	....	....	
5, 000	20, 000	.000650	.000175	....	....	
6, 250	25, 000	.000800	.000150	....	....	
7, 500	30, 000	.000975	.000175	....	....	
8, 750	35, 000	.001175	.000200	....	....	
10, 000	40, 000	.001300	.000125	....	....	
11, 250	45, 000	.001450	.000150	....	....	
12, 500	50, 000	.001650	.000200	....	....	
13, 750	55, 000	.001825	.000175	....	....	
14, 000	56, 000	.001900	.000075	....	....	Elastic limit.
14, 250	57, 000	.002050	.000150	....	....	
14, 500	58, 000	.002675	.000625	....	....	
14, 750	59, 000	.004200	.001525	....	....	
15, 000	60, 000	.005875	.001675	....	....	
15, 500	62, 000	.007875	.002000	....	....	
16, 000	64, 000	.009700	.001825	....	....	
16, 500	66, 000	.011750	.002050	....	....	
17, 000	68, 000	.013500	.001750	....	....	
17, 500	70, 000	.015450	.001950	....	....	
18, 000	72, 000	.017450	.002000	....	....	
18, 500	74, 000	.019750	.002300	....	....	
19, 000	76, 000	.022200	.002450	....	....	
19, 500	78, 000	.024500	.002300	....	....	
20, 000	80, 000	.027125	.002625	....	....	
20, 500	82, 000	.030000	.002875	....	....	
21, 000	84, 000	.033500	.003500	....	....	
21, 500	86, 000	.037500	.004000	....	....	
22, 000	88, 000	.041750	.004250	....	....	
22, 500	90, 000	.047125	.005375	....	....	
23, 000	92, 000	.053750	.006625	....	....	
23, 500	94, 000	.064700	.010950	....	....	
24, 000	86, 000	.0750	.0103	....	....	
24, 500	98, 000	.1250	.0500	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	98, 000
Elastic limit per square inch of original section	do...	56, 000
Elongation per inch after rupture	inch..	0. 2050
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.184
Reduction in area after rupture, per centum of orginal section		54. 6
Position of rupture		1″. 60 from the neck
Character of broken surface		silky
Elongation of inch sections		″. 15, ″. 41*, ″. 15, ″. 11

No. 3742.

Marks $^{12}\substack{\mathrm{M\ R_1\ A_7} \\ \mathrm{T_3\ M}}$
Diameter, ″.564.
Sectional area, .25 square inch

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent Set.	Successive permanent set,	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load
1, 250	5, 000	.000125	.000125	0.	....	
2, 500	10, 000	.000325	.000200	0.	....	
3, 750	15, 000	.000500	.000175	0.	....	
5, 000	20, 000	.000700	.000200	0.	....	
6, 250	25, 000	.000900	.000200	0.	....	
7, 500	30, 000	.001025	.000125	0.	....	
8, 750	35, 000	.001200	.000175	0.	....	
10, 000	40, 000	.001350	.000150	....	....	
11, 250	45, 000	.001525	.000175	....	....	
12, 500	50, 000	.001700	.000175	....	....	
13, 750	55, 000	.001900	.000200	....	....	
14, 000	56, 000	.001950	.000050	....	....	Elastic limit.
14, 250	57, 000	.002150	.000200	....	....	
14, 500	58, 000	.002925	.000775	....	....	
14, 750	59, 000	.004125	.001200	....	....	
15, 000	60, 000	.005375	.001250	....	....	
15, 500	62, 000	.007125	.001750	....	....	
16, 000	64, 000	.009000	.001875	....	....	
16, 500	66, 000	.010625	.001625	....	....	
17, 000	68, 000	.012300	.001675	....	....	
17, 500	70, 000	.014200	.001900	....	....	
18, 000	72, 000	.017375	.003175	....	....	
18, 500	74, 000	.018125	.000750	....	....	
19, 000	76, 000	.020425	.002300	....	....	
19, 500	78, 000	.022125	.001700	....	....	
20, 000	80, 000	.024500	.002375	....	....	
20, 500	82, 000	.026875	.002375	....	....	
21, 000	84, 000	.029500	.002625	....	....	
21, 500	86, 000	.032500	.003000	....	....	
22, 000	88, 000	.036125	.003625	....	....	
22, 500	90. 000	.040500	.004375	....	....	
23, 000	92, 000	.045250	.004750	....	....	
23, 500	94, 000	.051000	.005750	....	....	
24, 000	96, 000	.059000	.008000	....	....	
24, 500	98, 000	.0700	.0110	....	....	
25, 000	100, 000	.0850	.0150	....	....	
25, 110	100, 440	.1150	.0300	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	100, 440
Elastic limit per square inch of original section	do...	56, 000
Elongation per inch after rupture	inch..	0. 1950
Elongation per inch under strain at elastic limit	do...	.001950
Reduction in diameter at point of rupture	do...	.174
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		1″. 50 from the neck
Character of broken surface		silky
Elongation of inch sections		″.09, ″.14, ″.37*, ″18

HOOP B_1.

No. 3743.

Marks, $\genfrac{}{}{0pt}{}{12\ M\ R_1\ B_1}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 520	5, 000	.000125	.000125	0.	....	
2, 500	10, 000	.000325	.000200	0.	....	
3, 750	15, 000	.000500	.000175	0.	....	
5, 000	20, 000	.000675	.000175	0.	....	
6, 250	25, 000	.000825	.000150	0.	....	
7, 500	30, 000	.001000	.000175	0.	....	
8, 750	35, 000	.001175	.000175	0.	....	
10, 000	40, 000	.001300	.000125	0.	....	
11, 250	45, 000	.001475	.000175	....	....	
11, 500	46, 000	.001500	.000025	....	....	
11, 750	47, 000	.001550	.000050	....	....	Elastic limit.
12, 000	48, 000	.003850	.002300	....	....	
12, 250	49, 000	.004875	.001025	....	....	
12, 500	50, 000	.006250	.001375	....	....	
13, 000	52, 000	.009375	.003125	....	....	
13, 500	54, 000	.011950	.002575	....	....	
14, 000	56, 000	.013950	.002000	....	....	
14, 500	58, 000	.016250	.002300	....	....	
15, 000	60, 000	.019375	.003125	....	....	
15, 500	62, 000	.021000	.001625	....	....	
16, 000	64, 000	.023250	.002250	....	....	
16, 500	66, 000	.026000	.002750	....	....	
17, 000	68, 000	.029000	.003000	....	....	
17, 500	70, 000	.032250	.003250	....	....	
18, 000	72, 000	.036000	.003750	....	....	
18, 500	74, 000	.040750	.004750	....	....	
19, 000	76, 000	.045500	.004750	....	....	
19, 500	78, 000	.051625	.006125	....	....	
20, 000	80, 000	.058750	.007125	....	....	
20, 500	82, 000	.069250	.010500	....	....	
21, 000	84, 000	.0825	.013250	....	....	
21, 490	85, 960	.1200	.0375	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	85, 960
Elastic limit per square inch of original section .... do...	47, 000
Elongation per inch after rupture .... inch..	0. 1875
Elongation per inch under strain at elastic limit .... do...	.001550
Reduction in diameter at point of rupture .... do...	.194
Reduction in area after rupture, per centum of original section	57.0
Position of rupture	″.85 from the neck
Character of broken surface	silky
Elongation of inch sections	″.08, ″.10, ″.15,″, 42*

No. 3744.

Marks, $^{12\,\mathrm{M\,R_1\,B_1}}_{\mathrm{T_2\,I}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000150	.000150	0.	....	
2, 500	10, 000	.000325	.000175	0.	....	
3, 750	15, 000	.000525	.000200	0.	....	
5, 000	20, 000	.000750	.000225	0.	....	
6, 250	25, 000	.000925	.000175	0.	....	
7, 500	30, 000	.001050	.000125	0.	....	
8, 750	35, 000	.001225	.000175	0.	....	
10, 000	40, 000	.001375	.000150	0.	....	
11, 250	45, 000	.001550	.000175	....	....	
12, 500	50, 000	.001775	.000225	....	....	
12, 750	51, 000	.001800	.000025	....	....	
13, 000	52, 000	.001825	.000025	....	....	
13, 250	53, 000	.001850	.000025	....	....	
13, 500	54, 000	.001900	.000050	....	....	
13, 750	55, 000	.001925	.000025	....	....	
14, 000	56, 000	.001975	.000050	....	....	
14, 250	57, 000	.002025	.000050	....	....	
14, 500	58, 000	.002050	.000025	....	....	
14, 750	59, 000	.002100	.000050	....	....	Elastic limit.
15, 000	60, 000	.002275	.000175	....	....	
15, 250	61, 000	.002650	.000375	....	....	
15, 500	62, 000	.003750	.000100	....	....	
16, 000	64, 000	.006250	.002500	....	....	
16, 500	66, 000	.008500	.002250	....	....	
17, 000	68, 000	.010250	.001750	....	....	
17, 500	70, 000	.012125	.001875	....	....	
18, 000	72, 000	.014200	.002075	....	....	
18, 500	74, 000	.016250	.002050	....	....	
19, 000	76, 000	.018375	.002125	....	....	
19, 500	78, 000	.020750	.002375	....	....	
20, 000	80, 000	.023050	.002300	....	....	
20, 500	82, 000	.026000	.002950	....	....	
21, 000	84, 000	.028500	.002500	....	....	
21, 500	86, 000	.031200	.002700	....	....	
22, 000	88, 000	.034625	.003425	....	....	
22, 500	90, 000	.038500	.003875	....	....	
23, 000	92, 000	.043125	.004625	....	....	
23, 500	94, 000	.049375	.006250	....	....	
24, 000	96, 000	.056250	.006875	....	....	
24, 500	98, 000	.067000	.010750	....	....	
25, 000	100, 000	.0800	.0130	....	....	
25, 320	101, 280	.1175	.0375	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	101, 280
Elastic limit per square inch of original section	do	59, 000
Elongation per inch after rupture	inch	0. 1900
Elongation per inch under strain at elastic limit	do	.002100
Reduction in diameter at point of rupture	do	.154
Reduction in area after rupture, per centum of original section		47. 2
Position of rupture		1″.25 from the neck
Character of broken surface		silky
Elongation of inch sections		″.11, ″.14, ″.26*, ″.25

No. 3745.

Marks, $^{12\,M\,R_1\,B_1}_{\;\;T_3\,M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000175	.000175	.000025	.000025	
2, 500	10, 000	.000375	.000200	.000025	0.	
3, 750	15, 000	.000550	.000175	.000025	0.	
5, 000	20, 000	.000750	.000200	.000025	0.	
6, 250	25, 000	.000925	.000175	.000025	0.	
7, 500	30, 000	.001100	.000175	.000025	0.	
8, 750	35, 000	.001300	.000200	.000025	0.	
10, 000	40, 000	.001450	.000150	.000025	0.	
11, 250	45, 000	.001600	.000150	....	....	
12, 500	50, 000	.001800	.000200	....	....	
12, 750	51, 000	.001850	.000050	....	....	Elastic limit.
13, 000	52, 000	.002050	.000200	....	....	
13, 250	53, 000	.002175	.000125	....	....	
13, 500	54, 000	.003000	.000825	....	....	
13, 750	55, 000	.003750	.000750	....	....	
14, 000	56, 000	.005175	.001425	....	....	
14, 500	58, 000	.007625	.002450	....	....	
15, 000	60, 000	.009500	.001875	....	....	
15, 500	62, 000	.011625	.002125	....	....	
16, 000	64, 000	.013500	.001875	....	....	
16, 500	66, 000	.015625	.002125	....	....	
17, 000	68, 000	.017425	.001800	....	....	
17, 500	70, 000	.019750	.002325	....	....	
18, 000	72, 000	.022250	.002500	....	....	
18, 500	74, 000	.024750	.002500	....	....	
19, 000	76, 000	.027500	.002750	....	....	
19, 500	78, 000	.030875	.003375	....	....	
20, 000	80, 000	.034200	.003325	....	....	
20, 500	82, 000	.038375	.004175	....	....	
21, 000	84, 000	.043125	.004750	....	....	
21, 500	86, 000	.049250	.006125	....	....	
22, 000	88, 000	.057500	.008250	....	....	
22, 500	90, 000	.0725	.0150	....	....	
23, 000	92, 000	.0950	.0225	....	....	
23, 160	92, 640	.1175	.0225	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	92, 640
Elastic limit per square inch of original section	do	51, 000
Elongation per inch after rupture	inch	0. 1675
Elongation per inch under strain at elastic limit	do	. 001850
Reduction in diameter at point of rupture	do	. 174
Reduction in area after rupture, per centum of original section		52. 2
Position of rupture		1″ from the neck
Character of broken surface		silky
Elongation of inch sections		″.33*, ″.15, ″.11, ″.08

No. 3746.

Marks, $12\,\frac{M}{T_4}\,\frac{R_1}{M}\,B_1$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	....	
2,500	10,000	.000300	.000150	0.	....	
3,750	15,000	.000450	.000150	0.	....	
5,000	20,000	.000675	.000225	0.	....	
6,250	25,000	.000850	.000175	0.	....	
7,500	30,000	.001000	.000150	0.	....	
8,750	35,000	.001175	.000175	0.	....	
10,000	40,000	.001300	.000125	0.	....	
11,250	45,000	.001450	.000150	....	....	
12,500	50,000	.001675	.000225	....	....	
12,750	51,000	.001700	.000025	....	....	
13,000	52,000	.001725	.000025	....	....	
13,250	53,000	.001750	.000025	....	....	
13,500	54,000	.001800	.000050	....	....	
13,750	55,000	.001825	.000025	....	....	Elastic limit.
14,000	56,000	.001925	.000100	....	....	
14,250	57,000	.002125	.000200	....	....	
14,500	58,000	.002500	.000375	....	....	
14,750	59,000	.003000	.000500	....	....	
15,000	60,000	.004625	.001625	....	....	
15,500	62,000	.007200	.002575	....	....	
16,000	64,000	.009050	.001850	....	....	
16,500	66,000	.011000	.001950	....	....	
17,000	68,000	.012925	.001925	....	....	
17,500	70,000	.014625	.001700	....	....	
18,000	72,000	.016625	.002000	....	....	
18,500	74,000	.018500	.001875	....	....	
19,000	76,000	.020500	.002000	....	....	
19,500	78,000	.022925	.002425	....	....	
20,000	80,000	.025425	.002500	....	....	
20,500	82,000	.027825	.002400	....	....	
21,000	84,000	.030800	.002975	....	....	
21,500	86,000	.034125	.003325	....	....	
22,000	88,000	.038000	.003875	....	....	
22,500	90,000	.042750	.004750	....	....	
23,000	92,000	.048250	.005500	....	....	
23,500	94,000	.055250	.007000	....	....	
24,000	96,000	.0675	.012250	....	....	
24,500	98,000	.0800	.0125	....	....	
24,860	99,440	.1200	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99.440
Elastic limit per square inch of original section	do...	55.000
Elongation per inch after rupture	inch..	0.1925
Elongation per inch under strain at elastic limit	do...	.001825
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		1″.60 from the neck
Character of broken surface		silky
Elongation of inch sections		″.14, ″.39*, ″.14, ″.10

GAS-CHECK CUP.

No. 3751.

Marks, $\substack{12\ \mathrm{M\ R_1\ G\ C} \\ \mathrm{T_1\ O}}$
Diameter, ''.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	0.		
2, 500	10, 000	.000333	.000166	0.		
3, 750	15, 000	.000533	.000200	0.		
5, 000	20, 000	.000767	.000234	0.		
6, 250	25, 000	.000900	.000133	0.		
7, 500	30, 000	.001033	.000133	0.		
8, 750	35, 000	.001200	.000167	0.		
10, 000	40, 000	.001367	.000167	0.		
11, 250	45, 000	.001533	.000166			
12, 500	50, 000	.001733	.000200			
13, 750	55, 000	.001867	.000134			
15, 000	60, 000	.002067	.000200			
16, 250	65, 000	.002233	.000166			
17, 500	70, 000	.002400	.000167			
18, 000	72, 000	.002500	.000100			
18, 500	74, 000	.002600	.000100			
18, 750	75, 000	.002667	.000067			
19, 000	76, 000	.002767	.000100			Elastic limit.
19, 250	77, 000	.003233	.000466			
19, 500	78, 000	.003667	.000434			
20, 000	80, 000	.004833	.001166			
20, 500	82, 000	.005833	.001000			
21, 000	84, 000	.006767	.000934			
21, 500	86, 000	.007733	.000966			
22, 000	88, 000	.009067	.001334			
22, 500	90, 000	.010567	.001500			
23, 000	92, 000	.011333	.000766			
23, 500	94, 000	.012400	.001067			
24, 000	96, 000	.013700	.001300			
24, 500	98, 000	.015267	.001567			
25, 000	100, 000	.016667	.001400			
25, 500	102, 000	.018000	.001333			
26, 000	104, 000	.019333	.001333			
26, 500	106, 000	.020833	.001500			
27, 000	108, 000	.022500	.001667			
27, 500	110, 000	.023900	.001400			
28, 000	112, 000	.026167	.002267			
28, 500	114, 000	.028067	.001900			
29, 000	116, 000	.030233	.002166			
29, 500	118, 000	.032333	.002100			
30, 000	120, 000	.0333	.000967			
31, 000	124, 000	.0400	.0067			
32, 000	128, 000	.0500	.0100			
33, 000	132, 000	.0633	.0133			
33, 510	134, 040	.0933	.0300			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	134, 040
Elastic limit per square inch of original section	do	76, 000
Elongation per inch after rupture	inch	0. 1267
Elongation per inch under strain at elastic limit	do	.002767
Reduction in diameter at point of rupture	do	.094
Reduction in area after rupture, per centum of original section		30. 6
Position of rupture		''.70 from the neck
Character of broken surface		granular at circumference, 60 per cent.; silky center
Elongation of inch sections		''.21*, ''.09, ''.08

No. 3752.

Marks, $\begin{array}{c}12\ \mathrm{M\ R_1\ G\ C}\\ \mathrm{T_2\ M}\end{array}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	0.	....	
3,750	15,000	.000467	.000167	0.	....	
5,000	20,000	.000633	.000166	0.	....	
6,250	25,000	.000833	.000200	0.	....	
7,500	30,000	.001000	.000167	0.	....	
8,750	35,000	.001200	.000200	0.	....	
10,000	40,000	.001333	.000133	0.	....	
11,250	45,900	.001533	.000200	0.	....	
12,500	50,000	.001667	.000134	0.	....	
13,750	55,000	.001833	.000166	....	....	
15,000	60,000	.002000	.000167	....	....	
16,250	65,000	.002467	.000167	....	....	
17,500	70,000	.002333	.000166	....	....	
18,000	72,000	.002433	.000100	....	....	
18,500	74,000	.002533	.000100	....	....	Elastic limit.
18,750	75,000	.003033	.000500	....	....	
19,000	76,000	.003667	.000634	....	....	
19,500	78,000	.005600	.001933	....	....	
20,000	80,000	.006667	.001067	....	....	
20,500	82,000	.007633	.000966	....	....	
21,000	84,000	.008900	.001267	....	....	
21,500	86,000	.010667	.001767	....	....	
22,000	88,000	.011600	.000933	....	....	
22,500	90,000	.012233	.000633	....	....	
23,000	92,000	.013433	.001200	....	....	
23,500	94,000	.014733	.001300	....	....	
24,000	96,000	.016267	.001534	....	....	
24,500	98,000	.017667	.001400	....	....	
25,000	100,000	.019000	.001333	....	....	
26,000	104,000	.022000	.003000	....	....	
27,000	108,000	.025400	.003400	....	....	
28,000	112,000	.029333	.003933	....	....	
29,000	116,000	.034000	.004667	....	....	
30,000	120,000	.039667	.005667	....	....	
31,000	124,000	.0467	.007034	....	....	
32,000	128,000	.0600	.0133	....	....	
32,710	130,840	.0967	.0367	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	130 840
Elastic limit per square inch of original section	do...	74,000
Elongation per inch after rupture	inch..	0.1233
Elongation per inch under strain at elastic limit	do...	.002533
Reduction in diameter at point of rupture	do...	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		″.95 from the neck
Character of broken surface		granular at the circumference, 60 per cent.; silky center
Elongation of inch sections		″.21*, ″.08, ″.08

SPINDLE No. 2.

No. 3735.

Marks, $\begin{matrix}12\,M\,R_2\,Sp\\T_1\,O\end{matrix}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000300	.000133	0.	....	
3,750	15,000	.000400	.000100	0.	....	
5,000	20,000	.000567	.000167	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000933	.000200	0.	....	
8,750	35,000	.001033	.000100	0.	....	
10,000	40,000	.001200	.000167	0.	....	
11,250	45,000	.001300	.000100	....	....	
11,500	46,000	.001333	.000033	....	....	
11,750	47,000	.001400	.000067	....	....	Elastic limit.
12,000	48,000	.003400	.002000	....	....	
12,250	49,000	.005200	.001800	....	....	
12,500	50,000	.006333	.001133	....	....	
13,000	52,000	.007933	.001600	....	....	
13,500	54,000	.009667	.001734	....	....	
14,000	56,000	.011833	.002166	....	....	
14,500	58,000	.013733	.001900	....	....	
15,000	60,000	.015833	.002100	....	....	
15,500	62,000	.018000	.002167	....	....	
16,000	64,000	.020233	.002233	....	....	
16,500	66,000	.022667	.002434	....	....	
17,000	68,000	.025333	.002666	....	....	
17,500	70,000	.028500	.003167	....	....	
18,000	72,000	.031667	.003167	....	....	
18,500	74,000	.035667	.004000	....	....	
19,000	76,000	.0367	.0011	....	....	
19,500	78,000	.0433	.0066	....	....	
20,000	80,000	.0533	.0100	....	....	
20,500	82,000	.0600	.0067	....	....	
21,000	84,000	.0667	.0067	....	....	
21,500	86,000	.0900	.0233	....	....	
21,980	87,920	.1433	.0533	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	87,920
Elastic limit per square inch of original section	do	47,000
Elongation per inch after rupture	inch	.2467
Elongation per inch under strain at elastic limit	do	.001400
Reduction in diameter at point of rupture	do	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		1″.50 from the neck
Character of broken surface		fine, silky
Elongation of inch sections		″.21, ″.40*, ″.13

No. 3736.

Marks, ${}^{12\,M\,R_2\,Sp}_{T_2\,I}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	0.	....	
2, 500	10, 000	.000300	.000167	0.	....	
3, 750	15, 000	.000533	.000233	0.	....	
5, 000	20, 000	.000700	.000167	0.	....	
6, 250	25, 000	.000867	.000167	0.	....	
7, 500	30, 000	.001033	.000166	0.	....	
8, 750	35, 000	.001200	.000167	0.	....	
10, 000	40, 000	.001367	.000167	0.	....	
10, 500	42, 000	.001433	.000066	....	....	
10, 750	43, 000	.001500	.000067	....	....	
11, 000	44, 000	.001533	.000033	....	....	Elastic limit.
11, 250	45, 000	.001767	.000234	....	....	
11, 500	46, 000	.002833	.001066	....	....	
11, 750	47, 000	.006000	.003167	....	....	
12, 500	50, 000	.009500	.003500	....	....	
13, 000	52, 000	.011067	.001567	....	....	
13, 500	54, 000	.013000	.001933	....	....	
14, 000	56, 000	.014833	.001833	....	....	
14, 500	58, 000	.016867	.002034	....	....	
15, 000	60, 000	.019000	.002133	....	....	
15, 500	62, 000	.021333	.002333	....	....	
16, 000	64, 000	.024167	.002834	....	....	
16, 500	66, 000	.026667	.002500	....	....	
17, 000	68, 000	.029667	.003000	....	....	
17, 500	70, 000	.032667	.003000	....	....	
18, 000	72, 000	.037000	.004333	....	....	
18, 500	74, 000	.041262	.004267	....	....	
19, 000	76, 000	.046333	.005066	....	....	
19, 500	78, 000	.052500	.006167	....	....	
20, 000	80, 000	.060667	.008167	....	....	
20, 500	82, 000	.071667	.011000	....	....	
21, 000	84, 000	.0833	.011633	....	....	
21, 500	86, 000	.1133	.0300	....	....	
21, 620	86, 480	.1533	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86, 480
Elastic limit per square inch of original section	do...	44, 000
Elongation per inch after rupture	inch..	0. 2333
Elongation per inch under strain at elastic limit	do...	.001533
Reduction in diameter at point of rupture	do...	164
Reduction in area after rupture, per centum of original section		49, 7
Position of rupture		1″.70 from the neck
Character of broken surface		fine, silky
Elongation of inch sections		″.16, ″.41*, ″.13

HINGE PIN NO. 3.

No. 3804.

Marks, 12 M R_3 H P
L_1 M
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Suceessive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000067	.000067	....	....	
2, 500	10, 000	.000167	.000100	....	....	
3. 750	15, 000	.000267	.000100	....	....	
5, 000	20, 000	.000433	.000166	....	....	
6, 250	25, 000	.000600	.000167	....	....	
7, 500	30, 000	.000800	.000200	....	....	
8, 750	35, 000	.000933	.000133	....	....	
10, 000	40, 000	.001067	.000134	....	....	
11, 250	45, 000	.001200	.000133	....	....	
11, 500	46, 000	.001233	.000033	....	....	
11, 750	47, 000	.001267	.000034	....	....	
12, 000	48, 000	.001333	.000066	....	....	
12, 250	49, 000	.001367	.000034	....	....	Elastic limit.
12, 500	50, 000	.001467	.000100	....	....	
12, 750	51, 000	,001633	.000166	....	....	
13. 000	52 000	.002833	.001200	....	....	
13, 250	53, 000	.004833	.002000	....	....	
13, 500	54, 000	.006500	.001667	....	....	
14, 000	56. 000	.008600	.002100	....	....	
14, 500	58, 000	.010833	.002233	....	....	
15, 000	60, 000	.013333	.002500	....	....	
15, 500	62, 000	.015267	.001934	....	....	
16, 000	64, 000	.017567	.002300	....	....	
16, 500	66, 000	.019833	.002266	....	....	
17, 000	68, 000	.022533	.002700	....	....	
17, 500	70, 000	.025600	.003067	....	....	
18, 000	72, 000	.028833	.003233	....	....	
18, 500	74, 000	.032800	.003667	....	....	
19, 000	76, 000	.036667	.004167	....	....	
19, 500	78, 000	.041667	.005000	....	....	
20, 000	80, 000	.048167	.006500	....	....	
20, 500	82, 000	.055333	.007166	....	....	
21, 000	84, 000	.0667	.011367	....	....	
21, 500	86, 000	.0833	.0166	....	....	
21, 960	87, 840	.1367	.0534	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section.......pounds..	87, 840
Elastic limit per square inch of original section ....do...	49, 000
Elongation per inch after rupture ....inch..	0. 2600
Elongation per inch under strain at elastic limit.......do...	.001367
Reduction in diameter at point of rupture.......do...	.214
Reduction in area after rupture, per centum of original section.......	61. 5
Position of rupture	1″.70 from the neck
Character of broken surface	fine, silky
Elongation of inch sections.......	″.15, ″.48*, ″.15

TRANSVERSE ROLLER, No. 3.

No. 3803.

Marks, $\genfrac{}{}{0pt}{}{12\ M\ R_3\ T\ R\ R}{L_1\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	. 000100	. 000100	0.	------------	
2, 500	10, 000	. 000233	. 000133	0.	------------	
3, 750	15, 000	. 000367	. 000134	0.	------------	
5, 000	20, 000	. 000533	. 000166	0.	------------	
6, 250	25, 000	. 000667	. 000134	0.	------------	
7, 500	30, 000	. 000800	. 000133	0.	------------	
8, 750	35, 000	. 000967	. 000167	0.	------------	
10, 000	40, 000	. 001100	. 000133	0.	------------	
11, 250	45, 000	. 001267	. 000167	------------	------------	
12, 500	50, 000	. 001400	. 000133	------------	------------	Elastic limit.
12, 750	51, 000	. 001567	. 000167	------------	------------	
13, 000	52, 000	. 003000	. 001433	------------	------------	
13, 250	53, 000	. 005167	. 002167	------------	------------	
13, 500	54, 000	. 007067	. 001900	------------	------------	
14, 000	56, 000	. 009167	. 002100	------------	------------	
14, 500	58, 000	. 011333	. 002166	------------	------------	
15, 000	60, 000	. 013333	. 002000	------------	------------	
15, 500	62, 000	. 015600	. 002267	------------	------------	
16, 000	64, 000	. 017900	. 002300	------------	------------	
16, 500	66, 000	. 020400	. 002500	------------	------------	
17, 000	68, 000	. 023000	. 002600	------------	------------	
17, 500	70, 000	. 027000	. 004000	------------	------------	
18, 000	72, 000	. 030667	. 003667	------------	------------	
18, 500	74, 000	. 0350	. 004333	------------	------------	
19, 000	76, 000	. 0383	. 0033	------------	------------	
19, 500	78, 000	. 0417	. 0034	------------	------------	
20, 000	80, 000	. 0467	. 0050	------------	------------	
20, 500	82, 000	. 0567	. 0100	------------	------------	
21, 000	84, 000	. 0667	. 0100	------------	------------	
21, 500	86, 000	. 0800	. 0133	------------	------------	
22, 000	88, 000	. 1133	. 0333	------------	------------	
22, 040	88, 160	. 1467	. 0334	------------	------------	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	88, 160
Elastic limit per square inch of original section .... do...	50, 000
Elongation per inch after rupture .... inch..	0. 2633
Elongation per inch under strain at elastic limit .... do...	. 001400
Reduction in diameter at point of rupture .... do...	. 204
Reduction in area after rupture, per centum of original section	59. 3
Position of rupture	at middle of stem
Character of broken surface	fine; silky
Elongation of inch sections	″.16, ″.49*, ″.14

FACE PLATE, No. 7.

No. 3750.

Marks, $\substack{12\ \text{M R}_7\ \text{F P}\\ \text{T}_1\ \text{M}}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000167	.000167	0.		
2, 500	10, 000	.000300	.000133	0.		
3, 750	15, 000	.000433	.000133	0.		
5, 000	20, 000	.000600	.000167	0.		
6, 250	25, 000	.000833	.000233	0.		
7, 500	30, 000	.000967	.000134	0.		
8, 750	35, 000	.001100	.000133	0.		
10, 000	40, 000	.001233	.000133	0.		
11, 250	45, 000	.001400	.000167			
12, 000	48, 000	.001567	.000167			Elastic limit.
12, 250	49, 000	.901867	.000300			
12, 500	50, 000	.004267	.002400			
12, 750	51, 000	.005133	.000866			
13, 000	52, 000	.006333	.001200			
13, 200	54, 000	.008500	.002167			
14, 000	56, 000	.010500	.002000			
14, 500	58, 000	.012533	.002033			
15, 000	60, 000	.014900	.002367			
15, 500	62, 000	.016833	.001933			
16, 000	64, 000	.019000	.002167			
16, 500	66, 000	.021333	.002333			
17, 000	68, 000	.024167	.002834			
17, 500	70, 000	.027167	.003000			
18, 000	72, 000	.030667	.003500			
18, 500	74, 000	.034333	.003666			
19, 000	76, 000	.038933	.004600			
19, 500	78, 000	.044000	.005067			
20, 000	80, 000	.051333	.007333			
20, 500	82, 000	.058833	.007500			
21, 000	84, 000	.0700	.011167			
21, 500	86, 000	.0967	.0267			
21, 800	87, 200	.1567	.0600			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	87, 200
Elastic limit per square inch of original section	do	48, 000
Elongation per inch after rupture	inch	0. 2533
Elongation per inch under strain at elastic limit	do	.001567
Reduction in diameter at point of rupture	do	.194
Reduction in area after rupture, per centum of original section		57. 0
Position of rupture		at the middle of stem
Character of broken surface		silky
Elongation of inch sections		″.14, ″.47*, ″.15

BREECH BLOCK, No. 10.

No. 3801.

Marks, $\substack{12\ M\ R_{10}\ B\ B \\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000233	.000133	0.	....	
3,750	15,000	.000367	.000134	0.	....	
5,000	20,000	.000567	.000200	0.	....	
6,250	25,000	.000733	.000166	0.	....	
7,500	30,000	.000900	.000167	0.	....	
8,750	35,000	.001067	.000167	0.	....	
10,000	40,000	.001200	.000133	0.	....	
11,250	45,000	.001333	.000133	....	....	
12,000	48,000	.001467	.000134	....	....	
12,250	49,000	.001500	.000033	....	....	Elastic limit.
12,500	50,000	.001833	.000333	....	....	
12,750	51,000	.003700	.001867	....	....	
13,000	52,000	.005500	.001800	....	....	
13,500	54,000	.007167	.001667	....	....	
14,000	56,000	.009000	.001833	....	....	
14,500	58,000	.010833	.001833	....	....	
15,000	60,000	.012667	.001834	....	....	
15,500	62,000	.014667	.002000	....	....	
16,000	64,000	.016667	.002000	....	....	
16,500	66,000	.018833	.002166	....	....	
17,000	68,000	.021133	.002300	....	....	
17,500	70,000	.023567	.002434	....	....	
18,000	72,000	.026500	.002933	....	....	
18,500	74,000	.029600	.003100	....	....	
19,000	76,000	.032667	.003067	....	....	
19,500	78,000	.036667	.004000	....	....	
20,000	80,000	.041167	.004500	....	....	
20,500	82,000	.046333	.005166	....	....	
21,000	84,000	.0533	.006967	....	....	
21,500	86,000	.0600	.0067	....	....	
22,000	88,000	.0700	.0100	....	....	
22,500	90,000	.0933	.0233	....	....	
22,830	91,320	.1333	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	91,320
Elastic limit per square inch of original section	do	49,000
Elongation per inch after rupture	inch	0.2333
Elongation per inch under strain at elastic limit	do	.001500
Reduction in diameter at point of rupture	do	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		1″.20 from the neck
Character of broken surface		silky
Elongation of inch sections		″.30*, ″.25, ″.15

No. 3802.

Marks, $\underset{\mathrm{T_2\,I}}{12\ \mathrm{M\ R_{10}B\ B}}$

Diameter, ″.564.

Sectional area, .25 square inch.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000067	.000067	0.		
2, 500	10, 000	.000267	.000200	0.		
3, 750	15, 000	.000367	.000100	0.		
5, 000	20, 000	.000533	.000166	0.		
6, 250	25, 000	.000667	.000134	0.		
7, 500	30, 000	.000867	.000200	0.		
8, 750	35, 000	.001067	.000200	0.		
10, 000	40, 000	.001233	.000166	0.		
10, 250	41, 000	.001267	.000034			
10, 500	42, 000	.001300	.000033			
10, 750	43, 000	.001300	.0			
11, 000	44, 000	.001367	.000067			Elastic limit.
11, 250	45, 000	.001633	.000266			
11, 500	46, 000	.003000	.001367			
12, 750	47, 000	.005000	.002000			
12, 000	48, 000	.005833	.000833			
12, 500	50, 000	.008000	.002167			
13, 000	52, 000	.009700	.001700			
13, 500	54, 000	.011600	.001900			
14, 000	56, 000	.013567	.001967			
14, 500	58, 000	.015667	.002100			
15, 000	60, 000	.018000	.002333			
15, 500	62, 000	.020233	.002233			
16, 000	64, 000	.022833	.002600			
16, 500	66, 000	.025667	.002834			
17, 000	68, 000	.028333	.002666			
17, 500	70, 000	.032000	.003667			
18, 000	72, 000	.035833	.003833			
18, 500	74, 000	.040500	.004667			
19, 000	76, 000	.045333	.004833			
19, 500	78, 000	.0533	.007967			
20, 000	80, 000	.0633	.0100			
20, 500	82, 000	.0733	.0100			
21, 000	84, 000	.0933	.0200			
21, 410	85, 640	.1467	.0534			Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	85, 640
Elastic limit per square inch of original section .... do...	44, 000
Elongation per inch after rupture .... inch..	0. 2333
Elongation per inch under strain at elastic limit .... do...	.001367
Reduction in diameter at point of rupture .... do...	.174
Reduction in area after rupture, per centum of original section	52. 2
Position of rupture	″. 90 from the neck
Character of broken surface	silky
Elongation of inch sections	″. 40*, ″. 17, ″. 13

TABULATION OF TENSION SPECIMENS FROM 12-INCH B. L. RIFLED MORTARS.

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.	Remarks.
	Breech end.		*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*				
2775	Cast-iron body, No. 1	Outside		29, 590			Uniform coarse, granular			Tenacity specimen.
2776	do	Middle		29, 320			do	7. 2575	16. 07	Do.
2777	do	Inside		26, 300			do			Do.
	Muzzle end.									
3753	Cast-iron body, No. 1	Inside		29, 920			Uniform granular, mottled			
3754	do	do		29, 690			do	7. 2501	15. 83	
2873	do	do		30, 910			do	7. 2495	16. 15	Do.
2874	do	Outside		31, 100			do	7. 2472	15. 83	Do.
2875	do	Middle		31, 180			do			Do.
2876	do			31, 330			do			Do.
2877	do			31, 750			do			Do.
2878	do			31, 820			do			Do.

SECOND BODY CASTING.

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.	Remarks.
	Breech end.									
3763	Cast-iron body, No. 1	Inside		27, 230			Granular, mottled			
3764	do	do		27, 320			do			
3044	do	do		31, 060			do			Tenacity specimen.
3045	do	Outside		32, 810			do			Do.
3046	do	Middle		33, 080			do	7. 2478	16. 23	Do.
3047	do	do		32, 010			do			Do.
3048	do	Outside		32, 840			do			Do.
3040	do	Middle		31, 690			do			Do.
	Muzzle end.									
3761	Cast-iron body, No. 1	Inside		29, 060			Granular, mottled			
3762	do	do		28, 980			do			
3041	do	do		29, 920			do			Do.
3042	do	Outside		29, 880			do			Do.

TABULATION OF TENSION SPECIMENS FROM 12-INCH B. L. RIFLED MORTARS—Continued.

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.	Remarks.
	Muzzle end.		*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*				
3043	Cast-iron body, No. 1	Middle		31,070			Granular, mottled	7.2380	16.56	Tenacity specimen.
3050	do	Inside		30,020			do			Do.
3051	do	Outside		30,460			do			Do.
3052	do	Middle		30,450			do			Do.
3747	Trunnion hoop, No. 1	Inside	59,000	105,240	11.0	15.0	Granular			
3748	do	Middle	57,000	110,040	13.3	24.6	do			
3749	do	Outside	61,000	108,000	8.3	11.8	do			
3765	do	Inside	51,000	95,920	16.8	27.6	do			
3737	Hoop A_3	Outside	55,000	100,000	18.5	54.6	Fine silky			Mortar, No. 1.
3738	do	Inside	56,000	100,080	19.3	52.2	do			Do.
3739	do	Middle	52,000	101,480	17.0	41.9	Silky and granular			Do.
3726	Hoop A_4	Outside	55,000	101,280	19.8	54.6	Fine silky			Do.
3727	do	Inside	59,000	101,480	18.5	52.2	do			Do.
3728	do	Middle	52,000	97,040	20.8	52.2	do			Do.
3729	Hoop A_5	Outside	53,000	98,120	21.5	52.2	do			Do.
3730	do	Inside	55,000	99,640	19.0	52.2	do			Do.
3731	do	Middle	50,000	95,600	19.5	52.2	do			Do.
3732	Hoop A_6	Outside	59,000	100,480	19.3	54.6	do			Do.
3733	do	Inside	61,000	102,080	19.3	54.6	do			Do.
3734	do	Middle	58,000	102,000	19.0	49.7	do			Do.
3740	Hoop A_7	Outside	60,000	106,040	18.8	49.7	Silky			Do.
3741	do	Inside	56,000	98,000	20.5	54.6	do			Do.
3742	do	Middle	56,000	100,440	19.5	52.2	do			Do.
3743	Hoop B_1	Outside	47,000	85,960	18.8	57.0	do			Do.
3744	do	Inside	59,000	101,280	19.0	47.2	do			Do.
3745	do	Middle	51,000	92,640	16.8	52.2	do			Do.
3746	do	do	55,000	99,440	19.3	44.6	do			Do.
3751	Gas-check cup, No. 1	Outside	76,000	134,040	12.7	30.6	Granular silky center			
3752	do	Middle	74,000	130,840	12.3	30.6	do			
3735	Spindle, No. 2	Outside	47,000	87,920	24.7	54.6	Fine silky			
3736	do	Inside	44,000	86,480	23.3	49.7	do			
3804	Hinge-pin, No. 3	Middle	49,000	87,840	26.0	61.5	do			
3803	Transverse roller, No. 3	do	50,000	88,160	26.3	59.3	do			
3750	Face plate, No. 7	do	48,000	87,200	25.3	57.0	Silky			
3801	Breech-block, No. 10	Outside	49,000	91,320	23.3	52.2	do			
3802	do	Inside	44,000	85,640	23.3	52.2	do			

TABULATION OF COMPRESSION SPECIMENS FROM 12-INCH B. L. RIFLED MORTARS.

No. of Test.	Position in gun.	Location of specimens.	Ultimate strength per square inch.	Manner of failure.	Remarks.
	Muzzle end.		*Pounds.*		
773	Cast-iron body, No. 1	Middle	53, 250	Triple flexure	First casting.
774	do	do	53, 560	do	Do.
	Breech end.				
775	Cast-iron body, No. 1	Middle	54, 980	Triple flexure	Second casting.
776	do	do	60, 240	do	Do.
	Muzzle end.				
777	Cast-iron body, No. 1	Middle	53, 200	Triple flexure	Second casting.
778	do	do	54, 050	do	Do.

SQUARE STEEL WIRE,

MANUFACTURED BY THE WASHBURN AND MOEN MANUFACTURING COMPANY, WORCESTER, MASS.

FIRST LOT.

″.15 SQUARE STEEL WIRE.

First Coil Weight, 17¼ Pounds.

No. 2541.

Dimensions, ″ .1480 × ″ .1483.
Sectional area, .0219 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
109	5, 000	0.	0.	0.	0.	Initial load.
219	10, 000	.00017	.00017	.00001	.00001	
328	15, 000	.00035	.00018	.00001	0.	
438	20, 000	.00052	.00017	.00003	.00002	
547	25, 000	.00071	.00019	.00004	.00001	
657	30, 000	.00090	.00019	.00004	0.	
766	35, 000	.00110	.00020	.00004	0.	
876	40, 000	.00128	.00018	.00006	.00002	
985	41, 000	.00151	.00023	.00009	.00003	
1, 095	50, 000	.00169	.00018	.00010	.00001	
1, 204	55, 000	.00190	.00021	....	....	
1, 314	60, 000	.00212	.00022	.00018	.00008	
1, 423	65, 000	.00231	.00019	....	....	
1, 533	70, 000	.00253	.00022	.00026	.00008	
1, 642	75, 000	.00273	.00020	....	....	
1, 752	80, 000	.00297	.00024	.00034	.00008	
1, 861	85, 000	.00320	.00023	....	....	
1, 971	90, 000	.00344	.00024	.00040	.00006	
2, 080	95, 000	.00366	.00022	....	....	
2, 190	100, 000	.00392	.00026	.00052	.00012	Elastic limit.
2, 299	105, 000	.00425	.00033	....	....	
2, 409	110, 000	.00456	.00031	.00075	.00023	
2, 518	115, 000	.00490	.00034	....	....	
2, 628	120, 000	.00523	.00033	.00107	.00032	
2, 737	125, 000	.00573	.00050	....	....	
2, 847	130, 000	.00631	.00058	.00170	.00063	
2, 956	135, 000	.00731	.00100	....	....	
3, 066	140, 000	.01022	.00291	.00492	.00322	
3, 175	145, 000	.019	.00878	....	....	
3, 206	146, 390	....	....	....	....	Tensile strength

General summary.

Tensile strength per square inch of original section	pounds.	146, 390
Elastic limit per square inch of original section	do..	100, 000
Elongation per inch after rupture	inch.	0. 025
Elongation per inch under strain at elastic limit	do..	.00392
Reduction in area after rupture per centum of original section		28. 7
Position of rupture		2″.25 inside the gauged length
Character of broken surface		silky, serrated

No. 2542.

Dimensions, ″.1480 × ″.1483 = .0219 square inch.
Sectional area, .0219 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
109	5, 000	0.	0.	0.	0.	Initial load.
219	10, 000	.00020	.00020			
328	15, 000	.00037	.00017			
438	20, 000	.00056	.00019			
547	25, 000	.00074	.00018			
657	30, 000	.00094	.00020	.00004	.00004	
766	35, 000	.00113	.00019			
876	40, 000	.00133	.00020			
985	45, 000	.00152	.00019			
1, 095	50, 000	.00171	.00019	.00010	.00006	
1, 204	55, 000	.00192	.00021			
1, 314	60, 000	.00214	.00022	.00020	.00010	
1, 423	65, 000	.00234	.00020			
1, 533	70, 000	.00255	.00021	.00028	.00008	
1, 642	75, 000	.00274	.00019			
1, 752	80, 000	.00304	.00030	.00038	.00018	
1, 861	85, 000	.00324	.00020			
1, 971	90, 000	.00344	.00020	.00044	.00006	Elastic limit.
2, 080	95, 000	.00373	.00029			
2, 190	100, 000	.00400	.00027	.00062	.00018	
2, 299	105, 000	.00431	.00031			
2, 409	110, 000	.00458	.00027	.00083	.00021	
2, 518	115, 000	.00495	.00037			
2, 628	120, 000	.00532	.00037	.00118	.00035	
2, 737	125, 000	.00598	.00066			
2, 847	130, 000	.00651	.00053	.00189	.00071	
2, 956	135, 000	.00773	.00122			
3, 066	140, 000	.01142	.00369	.00602	.00413	
3, 175	145, 000					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	145, 000
Elastic limit per square inch of original section	do	90, 000
Elongation per inch after rupture	inch	0.020
Elongation per inch under strain at elastic limit	do	.00344
Reduction in area after rupture, per centum of original section		28.7
Position of rupture		½ inch inside the gauged length
Character of broken surface		silky

No. 2543.

Dimensions, ″.1480×″.1483.
Sectional area, .0219 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
109	5,000	0.	0.	0.	0.	Initial load.
219	10,000	.00019	.00019	....	....	
328	15,000	.00035	.00016	....	....	
438	20,000	.00052	.00017	....	....	
547	25,000	.00071	.00019	....	....	
657	30,000	.00088	.00017	.00001	.00001	
766	35,000	.00111	.00023	....	....	
876	40,000	.00129	.00018	....	....	
985	45,000	.00149	.00020	....	....	
1,095	50,000	.00168	.00019	.00012	.00011	
1,204	55,000	.00189	.00021	....	....	
1,314	60,000	.00210	.00021	.00015	.00003	
1,423	65,000	.00230	.00020	....	....	
1,533	70,000	.00253	.00023	.00022	.00007	
1,642	75,000	.00274	.00021	....	....	
1,752	80,000	.00298	.00024	.00036	.00014	
1,861	85,000	.00318	.00020	....	....	
1,971	90,000	.00342	.00024	.00041	.00005	
2,080	95,000	.00370	.00028	....	....	
2,190	100,000	.00390	.00020	.00057	.00016	Elastic limit.
2,299	105,000	.00423	.00033	....	....	
2,409	110,000	.00454	.00031	.00079	.00022	
2,518	115,000	.00492	.00038	....	....	
2,628	120,000	.00522	.00030	.00102	.00023	
2,737	125,000	.00574	.00052	....	....	
2,847	130,000	.00638	.00064	.00178	.00076	
2,956	135,000	.00742	.00104	....	....	
3,066	140,000	.01013	.00271	.00474	.00296	
3,175	145,000	.022	.01187	....	....	
3,210	146,580	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	146,580
Elastic limit per square inch of original section	do	100,000
Elongation per inch after rupture	inch	0.009
Elongation per inch under strain at elastic limit	do	.00390
Reduction in area after rupture, per centum of original section		22.8
Position of rupture		1¼″ outside the gauged length
Character of broken surface		silky

No. 2544.

Sample which contains two places along its length which are not square, but approach a round cross-section. These places are about ⅜″ long each.

Dimensions, ″.1466×″.1484.
Sectional area, .0219 square inch.
Tensile strength, 3,192 pounds = 145,750 pounds per square inch.
Fractured at one of the round places. Appearance of fracture, silky.

PARTIALLY ANNEALED.

No. 2545.

Dimensions, ".1480 × ".1483.
Sectional area, .0219 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
109	5,000	0.	0.	0.	0.	Initial load.
219	10,000	.00021	.00021	....	....	
328	15,000	.00042	.00021	....	....	
438	20,000	.00062	.00020	....	....	
547	25,000	.00085	.00023	....	....	
657	30,000	.00108	.00023	.00013	.00013	Elastic limit.
766	35,000	.00140	.00032	....	....	
876	40,000	.00171	.00031	.00038	.00025	
985	45,000	.00227	.00056	....	....	
1,095	50,000	.00282	.00055	.00118	.00080	
1,204	55,000	.00471	.00189	....	....	
1,314	60,000	.00898	.00427	.00678	.00560	
1,423	65,000	.016	.00702	....	....	
1,533	70,000	.021	.005	....	....	
1,642	75,000	.028	.007	....	....	
1,752	80,000	.038	.010	....	....	
1,861	85,000	.052	.014	....	....	
1,971	90,000	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	90,000
Elastic limit per square inch of original section	do	30,000
Elongation per inch after rupture	inch	0.087
Elongation per inch under strain at elastic limit	do	.00108
Reduction in area after rupture, per centum of original section		58.9
Position of rupture		1".3 inside the gauged length
Character of broken surface		fine, silky

PARTIALLY ANNEALED.

No. 2546.

Dimensions, ″.1480 × ″.1483.
Sectional area, .0219 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
109	5, 000	0.	0.	0.	0.	Initial load.
219	10, 000	.00017	.00017	....	....	
328	15, 000	.00037	.00020	....	....	
438	20, 000	.00060	.00023	....	....	
547	25, 000	.00082	.00022	....	....	
657	30, 000	.00104	.00022	.00017	.00017	Elastic limit.
766	35, 000	.00135	.00031	....	....	
876	40, 000	.00165	.00030	.00044	.00027	
985	45, 000	.00203	.00038	....	....	
1, 095	50, 000	.00248	.00045	.00086	.00042	
1, 204	55, 000	.00331	.00083	....	....	
1, 314	60, 000	.00712	.00381	.00498	.00412	
1, 423	65, 000	.01192	.00480	....	....	
1, 533	70, 000	.020	.00808	....	....	
1, 642	75, 000	.026	.006	....	....	
1, 752	80, 000	.036	.010	....	....	
1, 861	85, 000	.047	.011	....	....	
1, 971	90, 000	.068	.021	....	....	
2, 018	92, 150	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	92, 150
Elastic limit per square inch of original section ....do...	30, 000
Elongation per inch after rupture ....inch..	0. 098
Elongation per inch under strain at elastic limit ....do...	.00104
Reduction in area after rupture, per centum of original section	58. 9
Position of rupture	1¾″ inside the gauged length
Character of broken surface	fine, silky

SECOND COIL—WEIGHT, 23 POUNDS.

No. 2547.

Dimensions, ″.1492 × ″.1488.
Sectional area, .0222 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
111	5, 000	0.	0.	0.	0.	Initial load.
222	10, 000	.00016	.00016	....	....	
333	15, 000	.00033	.00017	....	....	
444	20, 000	.00046	.00013	....	....	
555	25, 000	.00060	.00014	....	....	
666	30, 000	.00081	.00021	....	....	
777	35, 000	.00098	.00017	....	....	
888	40, 000	.00116	.00018	0.	....	
999	45, 000	.00139	.00023	....	....	
1, 110	50, 000	.00154	.00015	....	....	
1, 221	55, 000	.00171	.00017	....	....	
1, 332	60, 000	.00192	.00021	.00002	.00002	
1, 443	65, 000	.00210	.00018	....	....	
1, 554	70, 000	.00231	.00021	....	....	
1, 665	75, 000	.00250	.00019	....	....	
1, 776	80, 000	.00268	.00018	.00009	.00007	
1, 887	85, 000	.00288	.00020	....	....	
1, 998	90, 000	.00310	.00022	....	....	
2, 109	95, 000	.00332	.00022	....	....	
2, 220	100, 000	.00354	.00022	.00021	.00012	
2, 331	105, 000	.00370	.00016	....	....	Elastic limit.
2, 442	110, 000	.00400	.00030	....	....	
2, 553	115, 000	.00429	.00029	....	....	
2, 664	120, 000	.00452	.00023	.00042	.00021	
2, 775	125, 000	.00490	.00038	....	....	
2, 886	130, 000	.00511	.00021	....	....	
2, 997	135, 000	.00542	.00031	....	....	
3, 108	140, 000	.00585	.00043	.00094	.00052	
3, 219	145, 000	.00644	.00059	....	....	
3, 330	150, 000	.00702	.00058	....	....	
3, 441	155, 000	.00797	.00095	....	....	
3, 552	160, 000	.01072	.00275	.00473	.00379	
3, 663	165, 000	.022	.01128	....	....	
3, 710	167, 120	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	167.120
Elastic limit per square inch of original section	do..	105.000
Elongation per inch after rupture	inch..	0.012
Elongation per inch under strain at elastic limit	do..	.00370
Reduction in area after rupture per centum of original section		29.7
Position of rupture		1″.35 outside the gauged length
Character of broken surface		silky

No. 2548.

Dimensions, ″.1492 × ″.1488.
Sectional area, .0222 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
111	5,000	0.	0.	0.	0.	Initial load.
222	10,000	.00019	.00019			
333	15,000	.00038	.00019			
444	20,000	.00057	.00019			
555	25,000	.00076	.00019			
666	30,000	.00093	.00017			
777	35,000	.00111	.00018			
888	40,000	.00129	.00018	.00008	.00008	
999	45,000	.00147	.00018			
1,110	50,000	.00167	.00020			
1,221	55,000	.00186	.00019			
1,332	60,000	.00206	.00020	.00015	.00007	
1,443	65,000	.00227	.00021			
1,554	70,000	.00246	.00019	.00024	.00009	
1,665	75,000	.00267	.00021			
1,776	80,000	.00287	.00020			
1,887	85,000	.00311	.00024			
1,998	90,000	.00332	.00021			
2,109	95,000	.00351	.00019			
2,220	100,000	.00376	.00025	.00041	.00017	
2,331	105,000	.00401	.00025			
2,442	110,000	.00423	.00022			Elastic limit.
2,553	115,000	.00451	.00028			
2,664	120,000	.00477	.00026	.00068	.00027	
2,775	125,000	.00508	.00031			
2,886	130,000	.00535	.00027			
2,997	135,000	.00569	.00034			
3,108	140,000	.00605	.00036	.00118	.00050	
3,219	145,000	.00654	.00049			
3,330	150,000	.00709	.00055			
3,441	155,000	.00828	.00119			
3,552	160,000	.01158	.00330	.00538	.00420	
3,663	165,000	.028	.01642			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	165,000
Elastic limit per square inch of original section	do	110,000
Elongation per inch after rupture	inch	0.022
Elongation per inch under strain at elastic limit	do	.00423
Reduction in area after rupture, per centum of original section		23.9
Position of rupture		4¾″ inside the gauged length
Character of broken surface		silky, slightly granular

No. 2549.

Dimensions, ″.1492 × ″.1488.
Sectional area, .0222 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
111	5, 000	0.	0.	0.	0.	Initial load.
222	10, 000	.00019	.00019			
333	15, 000	.00036	.00017			
444	20, 000	.00056	.00020			
555	25, 000	.00075	.00019			
666	30, 000	.00095	.00020			
777	35, 000	.00112	.00017			
888	40, 000	.00131	.00019	.00006	.00006	
999	45, 000	.00148	.00017			
1, 110	50, 000	.00168	.00020			
1, 221	55, 000	.00184	.00016			
1, 332	60, 000	.00203	.00019	.00013	.00007	
1, 443	65, 000	.00222	.00019			
1, 554	70, 000	.00243	.00021			
1, 665	75, 000	.00263	.00020			
1, 776	80, 000	.00283	.00020	.00023	.00010	
1, 887	85, 000	.00306	.00023			
1, 998	90, 000	.00325	.00019			
2, 109	95, 000	.00346	.00021			
2, 220	100, 000	.00373	.00027	.00042	.00019	
2, 331	105, 000	.00396	.00023			
2, 442	110, 000	.00418	.00022			Elastic limit.
2, 553	115, 000	.00446	.00028			
2, 664	120, 000	.00472	.00026	.00064	.00022	
2, 775	125, 000	.00502	.00030			
2, 886	130, 000	.00536	.00034			
2, 997	135, 000	.00566	.00030			
3, 108	140, 000	.00603	.00037	.00115	.00051	
3, 219	145, 000	.00646	.00043			
3, 330	150, 000	.00706	.00060			
3, 441	155, 000	.00827	.00121			
3, 552	160, 000	.01126	.00299	.00509	.00394	
3, 650	164, 410					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	164, 410
Elastic limit per square inch of original section	do...	110, 000
Elongation per inch after rupture	inch..	0. 007
Elongation per inch under strain at elastic limit	do...	.00148
Reduction in area after rupture, per centum of original section		29. 7
Position of rupture		outside the gauged length, in jaws of machine
Character of broken surface		silky

THIRD COIL—WEIGHT, 18¼ POUNDS.

No. 2550.

Dimensions, ″.1492 × ″.1488.
Sectional area, .0222 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
111	5,000	0.	0.	0.	0.	Initial load.
222	10,000	.00017	.00017	....	....	
333	15,000	.00035	.00018	....	....	
444	20,000	.00054	.00019	....	....	
555	25,000	.00074	.00020	....	....	
666	30,000	.00094	.00020	....	....	
777	35,000	.00100	.00006	....	....	
888	40,000	.00130	.00030	.00010	.00010	
999	45,000	.00148	.00018	....	....	
1,110	50,000	.00168	.00020	....	....	
1,221	55,000	.00188	.00020	....	....	
1,332	60,000	.00208	.00020	.00018	.00008	
1,443	65,000	.00227	.00019	....	....	
1,554	70,000	.00253	.00026	....	....	
1,665	75,000	.00275	.00022	....	....	
1,776	80,000	.00298	.00023	.00037	.00019	Elastic limit.
1,887	85,000	.00325	.00027	....	....	
1,998	90,000	.00353	.00028	....	....	
2,109	95,000	.00379	.00026	....	....	
2,220	100,000	.00413	.00034	.00072	.00035	
2,331	105,000	.00445	.00032	....	....	
2,442	110,000	.00479	.00034	....	....	
2,553	115,000	.00522	.00043	....	....	
2,664	120,000	.00572	.00052	.00144	.00072	
2,775	125,000	.00637	.00065	....	....	
2,886	130,000	.00734	.00097	....	....	
2,997	135,000	.00946	.00212	....	....	
3,108	140,000	.01634	.00688	.01058	.00914	
3,164	142,520	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	142,520
Elastic limit per square inch of original section	do	80,000
Elongation per inch after rupture	inch	0.009
Elongation per inch under strain at elastic limit	do	.00298
Reduction in area after rupture, per centum of original section		29.7
Position of rupture		outside the gauged length, in jaws of machine
Character of broken surface		silky

No. 2551.

Dimensions, ″.1492 × ″.1488.
Sectional area, .0222 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
111	5, 000	0.	0.	0.	0.	Initial load.
222	10, 000	.00019	.00019	....	....	
333	15, 000	.00035	.00016	....	....	
444	20, 000	.00053	.00018	....	....	
555	25, 000	.00074	.00021	....	....	
666	30, 000	.00092	.00018	....	....	
777	35, 000	.00109	.00017	....	....	
888	40, 000	.00129	.00020	.00004	.00004	
999	45, 000	.00149	.00020	....	....	
1, 110	50, 000	.00168	.00019	....	....	
1, 221	55, 000	.00188	.00020	....	....	
1, 332	60, 000	.00207	.00019	.00013	.00009	
1, 443	65, 000	.00228	.00021	....	....	
1, 554	70, 000	.00250	.00022	....	....	
1, 665	75, 000	.00271	.00021	....	....	
1, 776	80, 000	.00294	.00023	.00027	.00014	Rested 1 hour under initial load.
1, 887	85, 000	.00315	.00021	....	....	
1, 998	90, 000	.00338	.00023	....	....	Elastic limit.
2, 109	95, 000	.00368	.00030	....	....	
2, 220	100, 000	.00399	.00031	.00051	.00024	
2, 331	105, 000	.00423	.00024	....	....	
2, 442	110, 000	.00453	.00030	....	....	
2, 553	115, 000	.00494	.00041	....	....	
2, 664	120, 000	.00536	.00042	.00111	.00060	
2, 775	125, 000	.00584	.00048	....	....	
2, 886	130, 000	.00669	.00085	....	....	
2, 997	135, 000	.00849	.00180	....	....	
3, 108	140, 000	.01666	.00817	.01088	.00977	
3, 174	142, 970	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	142, 970
Elastic limit per square inch of original section	do...	90, 000
Elongation per inch after rupture	inch..	0. 013
Elongation per inch under strain at elastic limit	do...	.00338
Reduction in area after rupture, per centum of original section		29.7
Position of rupture		3″.1 inside the gauged length
Character of broken surface		silky, trace of fine granulation

No. 2552.

Dimensions, ″.1492 × ″.1488.
Sectional area, .0222 square inch.
Gauged length, ″10.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
111	5,000	0.	0.	0.	0.	Initial load.
222	10,000	.00017	.00017	------------	------------	
333	15,000	.00037	.00020	------------	------------	
444	20,000	.00056	.00019	------------	------------	
555	25,000	.00076	.00020	------------	------------	
666	30,000	.00093	.00017	------------	------------	
777	35,000	.00113	.00020	------------	------------	
888	40,000	.00132	.00019	.00006	.00006	
999	45,000	.00152	.00020	------------	------------	
1,110	50,000	.00170	.00018	------------	------------	
1,221	55,000	.00190	.00020	------------	------------	
1,332	60,000	.00210	.00020	.00016	.00010	
1,443	65,000	.00222	.00012	------------	------------	Remained under this load 2 hours.
1,554	70,000	.00250	.00028	------------	------------	
1,665	75,000	.00270	.00020	------------	------------	
1,776	80,000	.00290	.00020	.00027	.00011	
1,887	85,000	.00311	.00021	------------	------------	
1,998	90,000	.00334	.00023	------------	------------	
2,109	95,000	.00360	.00026	------------	------------	
2,220	100,000	.00386	.00026	.00049	.00022	Elastic limit.
2,331	105,000	.00419	.00033	------------	------------	
2,442	110,000	.00449	.00030	------------	------------	
2,553	115,000	.00482	.00033	------------	------------	
2,664	120,000	.00524	.00042	.00102	.00053	
2,775	125,000	.00573	.00049	------------	------------	
2,886	130,000	.00640	.00067	------------	------------	
2,997	135,000	.00789	.00149	------------	------------	
3,108	140,000	.01263	.00474	------------	------------	
3,193	143,830	------------	------------	------------	------------	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	143,830
Elastic limit per square inch of original section	do	100,000
Elongation per inch after rupture	inch	0.013
Elongation per inch under strain at elastic limit	do	.00386
Reduction in area after rupture, per centum of original section		23.9
Position of rupture		outside gauged length, in holder jaws
Character of broken surface		silky

FIRST LOT.

″.10 SQUARE STEEL WIRE.

FIRST COIL—WEIGHT, 23¾ POUNDS.

No. 2553.

Dimensions, ″.1003 × ″.1013.
Sectional area, ″.010.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
100	10,000	.00024	.00024	....	....	
150	15,000	.00044	.00020	....	....	
200	20,000	.00064	.00020	....	....	
250	25,000	.00083	.00019	....	....	
300	30,000	.00103	.00020	....	....	
350	35,000	.00121	.00018	....	....	
400	40,000	.00139	.00018	.00007	.00007	
450	45,000	.00160	.00021	....	....	
500	50,000	.00180	.00020	....	....	
550	55,000	.00200	.00020	....	....	
600	60,000	.00218	.00018	.00010	.00003	
650	65,000	.00242	.00024	....	....	
700	70,000	.00260	.00018	....	....	
750	75,000	.00278	.00018	....	....	
800	80,000	.00299	.00021	.00023	.00013	
850	85,000	.00322	.00023	....	....	
900	90,000	.00342	.00020	....	....	
950	95,000	.00364	.00022	....	....	Elastic limit.
1,000	100,000	.00390	.00026	.00036	.00013	
1,050	105,000	.00420	.00030	....	....	
1,100	110,000	.00448	.00028	....	....	
1,150	115,000	.00474	.00026	....	....	
1,200	120,000	.00509	.00035	.00071	.00035	
1,250	125,000	.00549	.00040	....	....	
1,300	130,000	.00588	.00039	....	....	
1,350	135,000	.00641	.00053	....	....	
1,400	140,000	.00722	.00081	.00184	.00113	
1,450	145,000	.00891	.00169	....	....	
1,500	150,000	.01232	.00341	....	....	
1,528	152,800	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds.. 152,800
Elastic limit per square inch of original section .... do... 95,000
Elongation per inch after rupture .... inch.. 0.009
Elongation per inch under strain at elastic limit .... do... .00364
Reduction in area after rupture, per centum of original section 36.0
Position of rupture .... outside gauged length, in holder jaws
Character of broken surface .... silky

No. 2554.

Dimensions, ″.1003 × ″.1013.
Sectional area, ″.01.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
100	10,000	.00023	.00023	....	....	
150	15,000	.00044	.00021	....	....	
200	20,000	.00064	.00020	....	....	
250	25,000	.00085	.00021	....	....	
300	30,000	.00105	.00020	....	....	
350	35,000	.00123	.00018	....	....	
400	40,000	.00144	.00021	.00009	.00009	
450	45,000	.00164	.00020	....	....	
500	50,000	.00184	.00020	....	....	
550	55,000	.00204	.00020	....	....	
600	60,000	.00228	.00024	.00013	.00004	
650	65,000	.00249	.00021	....	....	
700	70,000	.00269	.00020	....	....	
750	75,000	.00289	.00020	....	....	
800	80,000	.00313	.00024	.00031	.00018	
850	85,000	.00341	.00028	....	....	
900	90,000	.00362	.00021	....	....	
950	95,000	.00388	.00026	....	....	
1,000	100,000	.00412	.00024	.00052	.00021	Elastic limit.
1,050	105,000	.00442	.00030	....	....	
1,100	110,000	.00473	.00031	....	....	
1,150	115,000	.00502	.00029	....	....	
1,200	120,000	.00534	.00032	.00087	.00035	
1,250	125,000	.00583	.00049	....	....	
1,300	130,000	.00625	.00042	....	....	
1,350	135,000	.00688	.00063	....	....	
1,400	140,000	.00785	.00097	.00233	.00146	
1,450	145,000	.01039	.00254	....	....	
1,498	149,800	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	149,800
Elastic limit per square inch of original section	do	100,000
Elongation per inch after rupture	inch	0.006
Elongation per inch under strain at elastic limit	do	.00412
Reduction in area after rupture, per centum of original section		36.0
Position of rupture		2″.4 outside the gauged length
Character of broken surface		silky

No. 2555.

Dimensions, ″.1003 × ″.1013.
Sectional area, ″.01.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	
100	10,000	.00025	.00025			Initial load.
150	15,000	.00044	.00019			
200	20,000	.00065	.00021			
250	25,000	.00083	.00018			
300	30,000	.00103	.00020			
350	35,000	.00123	.00020			
400	40,000	.00141	.00018	.00003	.00003	
450	45,000	.00162	.00021			
500	50,000	.00178	.00016			
550	55,000	.00195	.00017			
600	60,000	.00216	.00021	.00007	.00004	
650	65,000	.00239	.00023			
700	70,000	.00256	.00017			
750	75,000	.00275	.00019			
800	80,000	.00295	.00020	.00011	.00004	
850	85,000	.00322	.00027			
900	90,000	.00341	.00019			
950	95,000	.00362	.00021			Elastic limit.
1,000	100,000	.00387	.00025	.00023	.00012	
1,050	105,000	.00416	.00029			
1,100	110,000	.00444	.00028			
1,150	115,000	.00475	.00031			
1,200	120,000	.00507	.00032	.00060	.00037	
1,250	125,000	.00551	.00044			
1,300	130,000	.00586	.00035			
1,350	135,000	.00641	.00055			
1,400	140,000	.00716	.00075	.00170	.00110	
1,450	145,000	.00890	.00174			
1,500	150,000	.01180	.00290			
1,526	152,600					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	152,600
Elastic limit per square inch of original section	do	95,000
Elongation per inch after rupture	inch	0.009
Elongation per inch under strain at elastic limit	do	.00362
Reduction in area after rupture, per centum of original section		28.0
Position of rupture		″.90 outside the gauged length
Character of broken surface		silky

PARTIALLY ANNEALED.

No. 2556.

Dimensions, ″.1003 × ″.1013.
Sectional area, ″.01.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
100	10,000	.00046	.00046	....	....	
150	15,000	.00062	.00016	....	....	
200	20,000	.00084	.00022	....	....	
250	25,000	.00109	.00025	....	....	
300	30,000	.00131	.00022	....	....	
350	35,000	.00153	.00022	....	....	Elastic limit.
400	40,000	.00183	.00030	.00023	.00023	
450	45,000	.00210	.00027	....	....	
500	50,000	.00244	.00034	....	....	
550	55,000	.00287	.00043	....	....	
600	60,000	.00348	.00061	....	....	
650	65,000	.00574	.00026	....	....	
700	70,000	.022	.01626	....	....	
750	75,000	.030	.008	....	....	
800	80,000	.035	.005	....	....	
850	85,000	.045	.010	....	....	
882	88,200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	88,200
Elastic limit per square inch of original section	do	35,000
Elongation per inch after rupture	inch	0.046
Elongation per inch under strain at elastic limit	do	.00153
Reduction in area after rupture, per centum of original section		55.0
Position of rupture		3″.10 outside the gauged length
Character of broken surface		silky

PARTIALLY ANNEALED.

No. 2557.

Dimensions ″.1003 × ″.1013.
Sectional area, ″.01.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	. 00037	. 00037	....	....	
150	15, 000	. 00062	. 00025	....	....	
200	20, 000	. 00088	. 00026	....	....	
250	25, 000	. 00112	. 00024	....	....	
300	30, 000	. 00136	. 00024	....	....	
350	35, 000	. 00161	. 00025	....	....	Elastic limit.
400	40, 000	. 00192	. 00031	. 00028	. 00028	
450	45, 000	. 00226	. 00034	....	....	
500	50, 000	. 00263	. 00037	....	....	
550	55, 000	. 00326	. 00063	....	....	
600	60, 000	. 00643	. 00317	....	....	
650	65, 000	. 013	. 00657	....	....	
700	70, 000	. 028	. 015	....	....	
750	75, 000	. 036	. 008	....	....	
800	80, 000	. 046	. 010	....	....	
845	84, 500	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	84, 500
Elastic limit per square inch of original section	do...	35, 000
Elongation per inch after rupture	inch..	0. 064
Elongation per inch under strain at elastic limit	do...	. 00161
Reduction in area after rupture, per centum of original section		58. 0
Position of rupture		″.25 inside the gauged length
Character of broken surface		silky

″.10 SQUARE STEEL WIRE.

SECOND COIL—WEIGHT, 34½ POUNDS.

No. 2558.

Dimensions, ″.1016 × ″.1016.
Sectional area, .0103 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
103	10, 000	.00020	.00020	....	....	
154	15, 000	.00036	.00016	....	....	
206	20, 000	.00056	.00020	....	....	
257	25, 000	.00074	.00018	....	....	
309	30, 000	.00094	.00020	....	....	
360	35, 000	.00111	.00017	....	....	
412	40, 000	.00131	.00020	.00000	.00000	
463	45, 000	.00151	.00020	....	....	
515	50, 000	.00171	.00020	....	....	
566	55, 000	.00188	.00017	....	....	
618	60, 000	.00208	.00020	.00009	.00009	
669	65, 000	.00231	.00023	....	....	
721	70, 000	.00250	.00019	....	....	
772	75, 000	.00270	.00020	....	....	
824	80, 000	.00288	.00018	.00016	.00007	
875	85, 000	.00314	.00026	....	....	
927	90, 000	.00333	.00019	....	....	
978	95, 000	.00355	.00022	....	....	Elastic limit.
1, 030	100, 000	.00382	.00027	.00033	.00017	
1, 081	105, 000	.00410	.00028	....	....	
1, 133	110, 000	.00435	.00025	....	....	
1, 184	115, 000	.00465	.00030	....	....	
1, 236	120, 000	.00502	.00037	.00065	.00032	
1, 287	125, 000	.00560	.00058	....	....	
1, 339	130, 000	.00607	.00047	....	....	
1, 390	135, 000	.00691	.00084	....	....	
1, 442	140, 000	.00879	.00188	....	....	
1, 493	145, 000	.018	.00921	....	....	
1, 514	146, 990	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	146, 990
Elastic limit per square inch of original section	do...	95, 000
Elongation per inch after rupture	inch..	0. 012
Elongation per inch under strain at elastic limit	do...	.00355
Reduction in area after rupture, per centum of original section		37. 9
Position of rupture		″.25 outside the gauged length
Character of broken surface		silky

No. 2559.

Dimensions, ".1016 × ".1016.
Sectional area, .0103 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
103	10,000	.00028	.00028	....	....	
154	15,000	.00048	.00020	....	....	
206	20,000	.00068	.00020	....	....	
257	25,000	.00088	.00020	....	....	
309	30,000	.00111	.00023	....	....	
360	35,000	.00127	.00016	....	....	
412	40,000	.00150	.00023	.00008	.00008	
463	45,000	.00174	.00024	....	....	
515	50,000	.00194	.00020	....	....	
566	55,000	.00214	.00020	....	....	
618	60,000	.00233	.00019	.00019	.00011	
669	65,000	.00256	.00023	....	....	
721	70,000	.00272	.00016	....	....	
772	75,000	.00294	.00022	....	....	
824	80,000	.00318	.00024	.00034	.00015	
875	85,000	.00339	.00021	....	....	
927	90,000	.00362	.00023	....	....	
978	95,000	.00384	.00022	....	....	
1,030	100,000	.00409	.00025	.00051	.00017	Elastic limit.
1,081	105,000	.00438	.00029	....	....	
1,133	110,000	.00468	.00030	....	....	
1,184	115,000	.00497	.00029	....	....	
1,236	120,000	.00531	.00034	.00089	.00038	
1,287	125,000	.00573	.00042	....	....	
1,339	130,000	.00620	.00047	....	....	
1,390	135,000	.00808	.00188	....	....	
1,442	140,000	.00852	.00044	.00308	.00219	
1,493	145,000	.016	....	....	....	
1,522	147,770	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	147,770
Elastic limit per square inch of original section	do	100,000
Elongation per inch after rupture	inch	0.017
Elongation per inch under strain at elastic limit	do	.00409
Reduction in area after rupture, per centum of original section		43.7
Position of rupture		2".4 inside the gauged length
Character of broken surface		silky

No. 2560.

Dimensions, ''.1016 × ''.1016.
Sectional area, .0103 square inch.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
103	10, 000	.00020	.00020			
154	15, 000	.00044	.00024			
206	20, 000	.00064	.00020			
257	25, 000	.00083	.00019			
309	30, 000	.00103	.00020			
360	35, 000	.00123	.00020			
412	40, 000	.00141	.00018	.00001	.00001	
463	45, 000	.00163	.00022			
515	50, 000	.00180	.00017			
566	55, 000	.00199	.00019			
618	60, 000	.00216	.00017	.00008	.00007	
669	65, 000	.00234	.00018			
721	70, 000	.00259	.00025			
772	75, 000	.00276	.00017			
824	80, 000	.00295	.00019	.00012	.00004	
875	85, 000	.00318	.00023			
927	90, 000	.00340	.00022			
978	95, 000	.00360	.00020			Elastic limit.
1, 030	100, 000	.00384	.00024	.00030	.00018	
1, 081	105, 000	.00414	.00030			
1, 133	110, 000	.00441	.00027			
1, 184	115, 000	.00473	.00032			
1, 236	120, 000	.00509	.00036	.00078	.00048	
1, 287	125, 000	.00556	.00047			
1, 339	130, 000	.00609	.00053			
1, 390	135, 000	.00699	.00090			
1, 442	140, 000	.00893	.00194	.00342	.00264	
1, 493	145, 000	.016	.00707			
1, 519	147, 480					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	147, 480
Elastic limit per square inch of original section	do	95, 000
Elongation per inch after rupture	inch	0. 012
Elongation per inch under strain at elastic limit	do	.00360
Reduction in area after rupture, per centum of original section		43. 7
Position of rupture		1''.35 outside the gauged length
Character of broken surface		silky

SECOND LOT.

″.10 SQUARE STEEL WIRE, NOT TINNED.

Samples which have not been coiled, cut from section of wire between the draw plate and reel of coil No. 1.

No. 2581.

Dimensions, ″.1003 × ″.1002.
Sectional area, .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	.00017	.00017	....	....	
150	15, 000	.00030	.00013	....	....	
200	20, 000	.00044	.00014	....	....	
250	25, 000	.00062	.00018	....	....	
300	30, 000	.00082	.00020	....	....	
350	35, 000	.00100	.00018	....	....	
400	40, 000	.00120	.00020	.00001	.00001	
450	45, 000	.00138	.00018	....	....	
500	50, 000	.00158	.00020	....	....	
550	55, 000	.00177	.00019	....	....	
600	60, 000	.00197	.00020	—.00002	—.00003	
650	65, 000	.00220	.00023	....	....	
700	70, 000	.00238	.00018	....	....	
750	75, 000	.00258	.00020	....	....	
800	80, 000	.00279	.00021	—.00002	0.	
850	85, 000	.00306	.00027	....	....	
900	90, 000	.00326	.00020	....	....	
950	95, 000	.00350	.00024	....	....	
1, 000	100, 000	.00377	.00027	.00007	.00009	
1, 050	105, 000	.00416	.00039	....	....	
1, 100	110, 000	.00437	.00021	....	....	Elastic limit.
1, 150	115, 000	.00467	.00030	....	....	
1, 200	120, 000	.00505	.00038	.00028	.00021	
1, 250	125, 000	.00549	.00044	....	....	
1, 300	130, 000	.00590	.00041	....	....	
1, 350	135, 000	.00638	.00048	....	....	
1, 400	140, 000	.00707	.00069	.00138	.00110	
1, 450	145, 000	.00818	.00111	....	....	
1, 500	150, 000	.00965	.00147	....	....	
1, 550	155, 000	.01260	.00295	....	....	
1, 560	156, 000	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	156, 000
Elastic limit per square inch of original section ....do...	110, 000
Elongation per inch after rupture ....inch..	0. 007
Elongation per inch under strain at elastic limit ....do...	.00437
Reduction in area after rupture, per centum of original section	44. 0
Position of rupture	at face of grips, outside the gauged length
Character of broken surface	silky

No. 2582.

Dimensions, ″.1006 × ″.1004.
Sectional area, .0101 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
101	10,000	.00024	.00024	....	....	
151	15,000	.00052	.00028	....	....	
202	20,000	.00072	.00020	....	....	
252	25,000	.00092	.00020	....	....	
303	30,000	.00115	.00023	....	....	
353	35,000	.00132	.00017	....	....	
404	40,000	.00152	.00020	0.	....	
454	45,000	.00169	.00017	....	....	
505	50,000	.00189	.00020	....	....	
555	55,000	.00210	.00021	....	....	
606	60,000	.00232	.00022	0.	....	
656	65,000	.00260	.00028	....	....	
707	70,000	.00277	.00017	....	....	
757	75,000	.00298	.00021	....	....	
808	80,000	.00320	.00022	.00008	.00008	
858	85,000	.00346	.00026	....	....	
909	90,000	.00368	.00022	....	....	
959	95,000	.00396	.00028	....	....	
1,010	100,000	.00422	.00026	.00041	.00033	
1,060	105,000	.00462	.00040	....	....	
1,111	110,000	.00487	.00025	....	....	Elastic limit.
1,161	115,000	.00523	.00036	....	....	
1,212	120,000	.00563	.00040	....	....	
1,262	125,000	.00617	.00054	....	....	
1,313	130,000	.00660	.00043	....	....	
1,363	135,000	.00723	.00063	....	....	
1,414	140,000	.00810	.00087	....	....	
1,464	145,000	.010	.0019	....	....	
1,515	150,000	.012	.002	....	....	
1,545	152,970	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	152,970
Elastic limit per square inch of original section	do...	110,000
Elongation per inch after rupture	inch..	0.017
Elongation per inch under strain at elastic limit	do...	.00487
Reduction in area after rupture, per centum of original section		39.6
Position of rupture		2″.8 inside the gauged length
Character of broken surface		silky

No. 2583.

Dimensions, ″.1004 × ″.1003.
Sectional area, .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
100	10,000	.00020	.00020	....	....	
150	15,000	.00041	.00021	....	....	
200	20,000	.00061	.00020	....	....	
250	25,000	.00082	.00021	....	....	
300	30,000	.00102	.00020	....	....	
350	35,000	.00120	.00018	....	....	
400	40,000	.00140	.00020	.00002	.00002	
450	45,000	.00162	.00022	....	....	
500	50,000	.00183	.00021	....	....	
550	55,000	.00200	.00017	....	....	
600	60,000	.00220	.00020	.00002	0.	
650	65,000	.00241	.00021	....	....	
700	70,000	.00267	.00026	....	....	
750	75,000	.00286	.00019	....	....	
800	80,000	.00303	.00017	.00002	0.	
850	85,000	.00325	.00022	....	....	
900	90,000	.00352	.00027	....	....	
950	95,000	.00381	.00029	....	....	
1,000	100,000	.00403	.00022	.00020	.00018	Elastic limit.
1,050	105,000	.00437	.00034	....	....	
1,100	110,000	.00470	.00033	....	....	
1,150	115,000	.00500	.00030	....	....	
1,200	120,000	.00535	.00035	.00057	.00037	
1,250	125,000	.00585	.00050	....	....	
1,300	130,000	.00622	.00037	....	....	
1,350	135,000	.00687	.00065	....	....	
1,400	140,000	.00744	.00057	.00175	.00118	
1,450	145,000	.00781	.00037	....	....	
1,500	150,000	.01010	.00229	....	....	
1,550	155,000	.013	.003	....	....	
1,572	157,200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section........pounds..	157,200
Elastic limit per square inch of original section........do...	100,000
Elongation per inch after rupture........inch..	0.016
Elongation per inch under strain at elastic limit........do...	.00403
Reduction in area after rupture, per centum of original section........	41.0
Position of rupture........	4″.6 inside the gauged length
Character of broken surface........	silky

SAMPLES FROM COIL NO. 1.

Diameter of coil, 27″.

No. 2584.

Dimensions, ″.1008 × ″.1008.
Sectional area, .0101 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
101	10,000	.00040	.00040	....	....	
151	15,000	.00061	.00021	....	....	
202	20,000	.00084	.00023	....	....	
252	25,000	.00105	.00021	....	....	
303	30,000	.00125	.00020	....	....	
353	35,000	.00148	.00023	....	....	
404	40,000	.00165	.00017	.00005	.00005	
454	45,000	.00194	.00029	....	....	
505	50,000	.00210	.00016	....	....	
555	55,000	.00230	.00020	....	....	
606	60,000	.00251	.00021	.00010	.00005	
656	65,000	.00277	.00026	....	....	
707	70,000	.00298	.00021	....	....	
757	75,000	.00320	.00022	....	....	
808	80,000	.00342	.00022	.00015	.00005	
858	85,000	.00370	.00028	....	....	
909	90,000	.00397	.00027	....	....	
959	95,000	.00427	.00030	....	....	
1,010	100,000	.00451	.00024	.00047	.00032	Elastic limit.
1,060	105,000	.00486	.00035	....	....	
1,111	110,000	.00516	.00030	....	....	
1,161	115,000	.00556	.00040	....	....	
1,212	120,000	.00595	.00039	.00098	.00051	
1,262	125,000	.00648	.00053	....	....	
1,313	130,000	.00689	.00041	....	....	
1,363	135,000	.00726	.00037	....	....	
1,414	140,000	.00822	.00096	.00222	.00124	
1,464	145,000	.00950	.00128	....	....	
1,515	150,000	.0105	.0010	....	....	
1,565	155,000	.012	.0015	....	....	
1,592	157,620	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	157,620
Elastic limit per square inch of original section	do	100,000
Elongation per inch after rupture	inch	0.017
Elongation per inch under strain at elastic limit	do	.00451
Reduction in area after rupture, per centum of original section		41.5
Position of rupture		1″.9 inside the gauged length
Character of broken surface		silky

No. 2585.

Dimensions, ″.1008 × ″.1008.
Sectional area, .0101 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
101	10, 000	.00027	.00027	....	....	
151	15, 000	.00053	.00026	....	....	
202	20, 000	.00078	.00025	....	....	
252	25, 000	.00102	.00024	....	....	
303	30, 000	.00122	.00020	....	....	
353	35, 000	.00142	.00020	....	....	
404	40, 000	.00168	.00026	0.	....	
454	45, 000	.00187	.00019	....	....	
505	50, 000	.00202	.00015	....	....	
555	55, 000	.00228	.00026	....	....	
606	60, 000	.00244	.00016	.00003	.00003	
656	65, 000	.00267	.00023	....	....	
707	70, 000	.00287	.00020	....	....	
757	75, 000	.00308	.00021	....	....	
808	80, 000	.00333	.00025	.00010	.00007	
858	85, 000	.00359	.00026	....	....	
909	90, 000	.00383	.00024	....	....	
959	95, 000	.00410	.00027	....	....	
1, 010	100, 000	.00438	.00028	.00041	.00031	Elastic limit.
1, 060	105, 000	.00471	.00033	....	....	
1, 111	110, 000	.00500	.00029	....	....	
1, 161	115, 000	.00534	.00034	....	....	
1, 212	120, 000	.00578	.00044	.00085	.00044	
1, 262	125, 000	.00623	.00045	....	....	
1, 313	130, 000	.00670	.00047	....	....	
1, 363	135, 000	.00727	.00057	....	....	
1, 414	140, 000	.00796	.00069	....	....	
1, 464	145, 000	.00905	.00109	....	....	
1, 515	150, 000	.01013	.00108	....	....	
1, 565	155, 000	.012	.00187	....	....	
1, 588	157, 230	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section........pounds..	157, 230
Elastic limit per square inch of original section........do...	100, 000
Elongation per inch after rupture........inch..	0. 019
Elongation per inch under strain at elastic limit........do...	.00438
Reduction in area after rupture, per centum of original section........	44. 6
Position of rupture........	4″.4 inside the gauged length
Character of broken surface........	silky

No. 2586.

Dimensions, ″.1008 × ″.1008.
Sectional area, .0101 square inch.
Gauged length, 10.″

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
101	10, 000	.00034	.00034	....	....	
151	15, 000	.00059	.00025	....	....	
202	20, 000	.00079	.00020	....	....	
252	25, 000	.00101	.00022	....	....	
303	30, 000	.00122	.00021	....	....	
353	35, 000	.00139	.00017	....	....	
404	40, 000	.00160	.00021	.00001	.00001	
454	45, 000	.00180	.00020	....	....	
505	50, 000	.00199	.00019	....	....	
555	55, 000	.00219	.00020	....	....	
606	60, 000	.00239	.00020	—.00012	—.00013	
656	65, 000	.00262	.00023	....	....	
707	70, 000	.00282	.00020	....	....	
757	75, 000	.00302	.00020	....	....	
808	80, 000	.00325	.00023	—.00016	—.00004	
858	85, 000	.00355	.00030	....	....	
909	90, 000	.00373	.00018	....	....	
959	95, 000	.00403	.00030	....	....	
1, 010	100, 000	.00431	.00028	.00003	.00019	
1, 060	105, 000	.00462	.00031	....	....	
1, 111	110, 000	.00489	.00027	....	....	Elastic limit.
1, 161	115, 000	.00520	.00031	....	....	
1, 212	120, 000	.00556	.00036	.00020	.00017	
1, 262	125, 000	.00603	.00047	....	....	
1, 313	130, 000	.00643	.00040	....	....	
1, 363	135, 000	.00688	.00045	....	....	
1, 414	140, 000	.00748	.00060	.00099	.00079	
1, 464	145, 000	.00822	.00074	....	....	
1, 515	150, 000	.009	.00078	....	....	
1, 565	155, 000	.010	.001	....	....	
1, 616	160, 000	.014	.004	....	....	
1, 621	160, 500	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	160, 500
Elastic limit per square inch of original section ....do...	100, 000
Elongation per inch after rupture ....inch..	0.017
Elongation per inch under strain at elastic limit..............................do...	.00489
Reduction in area after rupture, per centum of original section..............................	44.6
Position of rupture..............................	2″.9 inside the gauged length
Character of broken surface	silky

SECOND COIL NO. 1. MARKED, "BEFORE TINNING."

Diameter of coil, 18½″.

Straightened between rolls before testing.

No. 2587.

Dimensions, ″.1010 × ″.1010.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
102	10,000	.00025	.00025	------------	------------	
153	15,000	.00050	.00025	------------	------------	
204	20,000	.00065	.00015	------------	------------	
255	25,000	.00085	.00020	------------	------------	
306	30,000	.00105	.00020	------------	------------	
357	35,000	.00121	.00016	------------	------------	
408	40,000	.00144	.00023	0.	------------	
459	45,000	.00165	.00021	------------	------------	
510	50,000	.00185	.00020	------------	------------	
561	55,000	.00205	.00020	------------	------------	
612	60,000	.00225	.00020	.00008	.00008	
663	65,000	.00250	.00025	------------	------------	
714	70,000	.00272	.00022	------------	------------	
765	75,000	.00298	.00026	------------	------------	
816	80,000	.00325	.00027	.00026	.00018	
867	85,000	.00360	.00035	------------	------------	
918	90,000	.00388	.00028	------------	------------	Elastic limit.
969	95,000	.00425	.00037	------------	------------	
1,020	100,000	.00465	.00040	.00076	.00050	
1,071	105,000	.00505	.00040	------------	------------	
1,122	110,000	.00547	.00042	------------	------------	
1,173	115,000	.00596	.00049	------------	------------	
1,224	120,000	.00658	.00062	.00176	.00100	
1,275	125,000	.00739	.00081	------------	------------	
1,326	130,000	.00823	.00084	------------	------------	
1,377	135,000	.00989	.00166	------------	------------	
1,428	140,000	.012	.00211	.00607	.00431	
1,479	145,000	.017	.005	------------	------------	
1,507	147,750	------------	------------	------------	------------	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	147,750
Elastic limit per square inch of original section	do	90,000
Elongation per inch after rupture	inch	0.024
Elongation per inch under strain at elastic limit	do	.00388
Reduction in area after rupture, per centum of original section		40.2
Position of rupture		3″.15 inside the gauged length
Character of broken surface		silky

No. 2588.

Dimensions, ″.1010 × ″.1010.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00034	.00034	....	....	
153	15, 000	.00053	.00019	....	....	
204	20, 000	.00073	.00020	....	....	
255	25, 000	.00093	.00020	....	....	
306	30, 000	.00112	.00019	....	....	
357	35, 000	.00134	.00022	....	....	
408	40, 000	.00149	.00015	0.	....	
459	45, 000	.00177	.00028	....	....	
510	50, 000	.00196	.00019	....	....	
561	55, 000	.00217	.00021	....	....	
612	60, 000	.00240	.00023	.00019	.00019	
663	65, 000	.00258	.00018	....	....	
714	70, 000	.00287	.00029	....	....	
765	75, 000	.00314	.00027	....	....	
816	80, 000	.00339	.00025	.00038	.00019	
867	85, 000	.00366	.00027	....	....	
918	90, 000	.00402	.00036	....	....	
969	95, 000	.00427	.00025	....	....	Elastic limit.
1, 020	100, 000	.00459	.00032	.00076	.00038	
1, 071	105, 000	.00500	.00041	....	....	
1, 122	110, 000	.00536	.00036	....	....	
1, 173	115 000	.00579	.00043	....	....	
1, 224	120, 000	.00640	.00061	.00155	.00079	
1, 275	125, 000	.00719	.00079	....	....	
1, 326	130, 000	.00810	.00091	....	....	
1, 377	135, 000	.00957	.00147	....	....	
1, 428	140, 000	.01240	.00283	.00650	.00495	
1, 479	145, 000	.016	.0036	....	....	
1, 505	147, 550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds..	147, 550
Elastic limit per square inch of original section..........do...	95, 000
Elongation per inch after rupture..........inch..	0. 014
Elongation per inch under strain at elastic limit..........do...	.00427
Reduction in area after rupture, per centum of original section..........	42. 2
Position of rupture..........	″.65 outside the gauged length
Character of broken surface..........	silky

No. 2589.

Dimensions, ″.1010 × ″.1010.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
102	10,000	.00022	.00022			
153	15,000	.00042	.00020			
204	20,000	.00061	.00019			
255	25,000	.00082	.00021			
306	30,000	.00102	.00020			
357	35,000	.00120	.00018			
408	40,000	.00142	.00022	0.		
459	45,000	.00164	.00022			
510	50,000	.00184	.00020			
561	55,000	.00205	.00021			
612	60,000	.00230	.00025	.00007	.00007	
663	65,000	.00256	.00026			
714	70,000	.00278	.00022			
765	75,000	.00302	.00024			
816	80,000	.00330	.00028	.00030	.00023	
867	85,000	.00364	.00034			
918	90,000	.00392	.00028			
969	95,000	.00432	.00040			
1,020	100,000	.00460	.00028	.00072	.00042	Elastic limit.
1,071	105,000	.00504	.00044			
1,122	110,000	.00542	.00038			
1,173	115,000	.00600	.00058			
1,224	120,000	.00660	.00060	.00180	.00108	
1,275	125,000	.00724	.00064			
1,326	130,000	.00850	.00126			
1,377	135,000	.00998	.00148			
1,428	140,000	.01278	.00280	.00679	.00499	
1,479	145,000	.018	.00522			
1,504	147,450					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	147,450
Elastic limit per square inch of original section	do...	100,000
Elongation per inch after rupture	inch..	0.024
Elongation per inch under strain at elastic limit	do...	.00460
Reduction in area after rupture, per centum of original section		40.2
Position of rupture		″.60 inside the gauged length
Character of broken surface		silky

OIL-TEMPERED WIRE.

COIL NO. 6—3.

When uncoiled the wire is nearly straight.

No. 2590.

Dimensions, ″.1000 × ″.1002.
Sectional area, .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	.00023	.00023	....	....	
150	15, 000	.00046	.00023	....	....	
200	20, 000	.00066	.00020	....	....	
250	25, 000	.00084	.00018	....	....	
300	30, 000	.00100	.00016	....	....	
350	35, 000	.00120	.00020	....	....	
400	40, 000	.00135	.00015	.00001	.00001	
450	45, 000	.00155	.00020	....	....	
500	50, 000	.00171	.00016	....	....	
550	55, 000	.00191	.00020	....	....	
600	60, 000	.00205	.00014	.00001	0.	
650	65, 000	.00225	.00020	....	....	
700	70, 000	.00243	.00018	....	....	
750	75, 000	.00260	.00017	....	....	
800	80, 000	.00280	.00020	—.00007	—.00008	
850	85, 000	.00297	.00017	....	....	
900	90, 000	.00313	.00016	....	....	
950	95, 000	.00331	.00018	....	....	
1, 000	100, 000	.00351	.00020	.00002	.00009	
1, 050	105, 000	.00371	.00020	....	....	
1, 100	110, 000	.00390	.00019	....	....	
1, 150	115, 000	.00409	.00019	....	....	
1, 200	120, 000	.00426	.00017	.00002	0.	
1, 250	125, 000	.00452	.00026	....	....	
1, 300	130, 000	.00465	.00013	....	....	
1, 350	135, 000	.00485	.00020	....	....	
1, 400	140, 000	.00505	.00020	.00010	.00008	
1, 450	145, 000	.00525	.00020	....	....	
1, 500	150, 000	.00547	.00022	....	....	
1, 550	155, 000	.00570	.00023	....	....	
1, 600	160, 000	.00590	.00020	.00016	.00006	
1, 650	165, 000	.00617	.00027	....	....	
1, 700	170, 000	.00640	.00023	....	....	
1, 750	175, 000	.00666	.00026	....	....	Elastic limit.
1, 800	180, 000	.00713	.00047	.00068	.00052	
1, 850	185, 000	.00793	.00080	....	....	
1, 900	190, 000	.00926	.00133	.00225	.00157	
1, 950	195, 000	.013	.00374	....	....	
2, 000	200, 000	.019	.006	....	....	
2, 045	204, 500	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	204, 500
Elastic limit per square inch of original section	do	175, 000
Elongation per inch after rupture	inch	0.016
Elongation per inch under strain at elastic limit	do	.00666
Reduction in area after rupture, per centum of original section		44.0
Position of rupture		2″.9 outside the gauged length
Character of broken surface		silky

No. 2591.

Dimensions, ″.1000 × ″.1002.
Sectional area, .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	.00026	.00026	....	....	
150	15, 000	.00050	.00024	....	....	
200	20, 000	.00069	.00019	....	....	
250	25, 000	.00084	.00015	....	....	
300	30, 000	.00104	.00020	....	....	
350	35, 000	.00124	.00020	....	....	
400	40, 000	.00139	.00015	....	....	
450	45, 000	.00156	.00017	....	....	
500	50, 000	.00173	.00017	....	....	
550	55, 000	.00188	.00015	....	....	
600	60, 000	.00205	.00017	....	....	
650	65, 000	.00223	.00018	....	....	
700	70, 000	.00243	.00020	....	....	
750	75, 000	.00261	.00018	....	....	
800	80, 000	.00275	.00014	....	....	
850	85, 000	.00292	.00017	....	....	
900	90, 000	.00309	.00017	....	....	
950	95, 000	.00324	.00015	....	....	
1, 000	100, 000	.00342	.00018	—.00008	—.00008	
1, 050	105, 000	.00364	.00022	....	....	
1, 100	110, 000	.00380	.00016	....	....	
1, 150	115, 000	.00397	.00017	....	....	
1, 200	120, 000	.00416	.00019	....	....	
1, 250	125, 000	.00434	.00017	....	....	
1, 300	130, 000	.00454	.00020	....	....	
1, 350	135, 000	.00471	.00017	....	....	
1, 400	140, 000	.00490	.00019	—.00010	—.00002	
1, 450	145, 000	.00510	.00020	....	....	
1, 500	150, 000	.00526	.00016	....	....	
1, 550	155, 000	.00545	.00019	....	....	
1, 600	160, 000	.00565	.00020	....	....	
1, 650	165, 000	.00584	.00019	....	....	
1, 700	170, 000	.00605	.00021	....	....	
1, 750	175, 000	.00632	.00027	....	....	
1, 800	180, 000	.00655	.00023	.00007	.00017	Elastic limit.
1, 850	185, 000	.00712	.00057	....	....	
1, 900	190, 000	.00736	.00024	....	....	
1, 950	195, 000	.00825	.00089	....	....	
2, 000	200, 000	.01040	.00215	....	....	
2, 050	205, 000	.014	.0036	....	....	
2, 100	210, 000	.020	.006	....	....	
2, 138	213, 800	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds.. 213, 800
Elastic limit per square inch of original section..do .. 180, 000
Elongation per inch after rupture ....inch.. 0. 021
Elongation per inch under strain at elastic limit ....do... .00655
Reduction in area after rupture, per centum of original section.................................... 42. 0
Position of rupture...3″. 4 outside the gauged length
Character of broken surface..silky

No. 2592.

Dimensions, ″.1000 × ″.1002.
Sectional area, .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	.00024	.00024	....	....	
150	15, 000	.00044	.00020	....	....	
200	20, 000	.00062	.00018	....	....	
250	25, 000	.00081	.00019	....	....	
300	30, 000	.00095	.00014	....	....	
350	35, 000	.00115	.00020	....	....	
400	40, 000	.00130	.00015	....	....	
450	45, 000	.00148	.00018	....	....	
500	50, 000	.00165	.00017	....	....	
550	55, 000	.00183	.00018	....	....	
600	60, 000	.00201	.00018	....	....	
650	65, 000	.00216	.00015	....	....	
700	70, 000	.00235	.00019	....	....	
750	75, 000	.00251	.00016	....	....	
800	80, 000	.00269	.00018	....	....	
850	85, 000	.00285	.00016	....	....	
900	90, 000	.00304	.00019	....	....	
950	95, 000	.00321	.00017	....	....	
1, 000	100, 000	.00341	.00020	.00001	.00001	
1, 050	105, 000	.00359	.00018	....	....	
1, 100	110, 000	.00379	.00020	....	....	
1, 150	115, 000	.00397	.00018	....	....	
1, 200	120, 000	.00415	.00018	....	....	
1, 250	125, 000	.00435	.00020	....	....	
1, 300	130, 000	.00455	.00120	....	....	
1, 350	135, 000	.00472	.00017	....	....	
1, 400	140, 000	.00489	.00017	....	....	
1, 450	145, 000	.00510	.00021	....	....	
1, 500	150, 000	.00529	.00019	....	....	
1, 550	155, 000	.00549	.00020	....	....	
1, 600	160, 000	.00579	.00030	....	....	
1, 650	165, 000	.00603	.00024	....	....	
1, 700	170, 000	.00622	.00019	....	....	
1, 750	175, 000	.00647	.00025	....	....	Elastic limit.
1, 800	180, 000	.00682	.00035	.00051	.00050	
1, 850	185, 000	.00745	.00063	....	....	
1, 900	190, 000	.00888	.00143	....	....	
1, 950	195, 000	.01158	.00270	....	....	
1, 995	199, 500	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	199, 500
Elastic limit per square inch of original section	do...	175, 000
Elongation per inch after rupture	inch..	0. 005
Elongation per inch under strain at elastic limit	do...	.00647
Reduction in area after rupture, per centum of original section		44. 0
Position of rupture		6″.9 outside the gauged length
Character of broken surface		silky

COIL No. 6—2.

When wire is uncoiled it assumes a curve of 1¼″ V sine on a chord of 18″.

No. 2593.

Dimensions, ″.0995 × ″.0997.
Sectional area, .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
99	10,000	.00033	.00033	....	....	
148	15,000	.00053	.00020	....	....	
198	20,000	.00073	.00020	....	....	
247	25,000	.00093	.00020	....	....	
297	30,000	.00108	.00015	....	....	
346	35,000	.00127	.00019	....	....	
396	40,000	.00144	.00017	0.	0.	
445	45,000	.00164	.00020	....	....	
495	50,000	.00179	.00015	....	....	
544	55,000	.00196	.00017	....	....	
594	60,000	.00215	.00019	0.	0.	
643	65,000	.00237	.00022	....	....	
693	70,000	.00251	.00014	....	....	
742	75,000	.00268	.00017	....	....	
792	80,000	.00287	.00019	0.	....	
841	85,000	.00305	.00018	....	....	
891	90,000	.00318	.00013	....	....	
940	95,000	.00335	.00017	....	....	
990	100,000	.00355	.00020	.00006	.00006	
1,039	105,000	.00374	.00019	....	....	
1,089	110,000	.00393	.00019	....	....	
1,138	115,000	.00411	.00018	....	....	
1,188	120,000	.00435	.00024	.00007	.00001	
1,237	125,000	.00452	.00017	....	....	
1,287	130,000	.00470	.00018	....	....	
1,336	135,000	.00492	.00022	....	....	
1,386	140,000	.00512	.00020	.00021	.00014	
1,435	145,000	.00527	.00015	....	....	
1,485	150,000	.00552	.00025	....	....	
1,534	155,000	.00574	.00022	....	....	Elastic limit.
1,584	160,000	.00609	.00035	.00047	.00026	
1,633	165,000	.00685	.00076	....	....	
1,683	170,000	.01135	.00450	....	....	
1,732	175,000	.025	.01365	....	....	
1,782	180,000	.045	.020	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	180,000
Elastic limit per square inch of original section	do...	155,000
Elongation per inch after rupture	inch..	0.033
Elongation per inch under strain at elastic limit	do...	.00574
Reduction in area after rupture, per centum of original section		47.5
Position of rupture		1″.5 outside the gauged length
Character of broken surface		silky

No. 2594.

Dimensions, ″.0995 × ″.0997.
Sectional area, .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
99	10, 000	.00040	.00040	....	....	
148	15, 000	.00065	.00025	....	....	
198	20, 000	.00088	.00023	....	....	
247	25, 000	.00107	.00019	....	....	
297	30, 000	.00128	.00021	....	....	
346	35, 000	.00144	.00016	....	....	
396	40, 000	.00163	.00019	....	....	
445	45, 000	.00181	.00018	....	....	
495	50, 000	.00199	.00018	....	....	
544	55, 000	.00216	.00017	....	....	
594	60, 000	.00235	.00019	....	....	
643	65, 000	.00249	.00014	....	....	
693	70, 000	.00268	.00019	....	....	
742	75, 000	.00287	.00019	....	....	
792	80, 000	.00306	.00019	....	....	
841	85, 000	.00324	.00018	....	....	
891	90, 000	.00344	.00020	....	....	
940	95, 000	.00363	.00019	....	....	
990	100, 000	.00372	.00009	....	....	
1, 039	105, 000	.00398	.00026	....	....	
1, 089	110, 000	.00420	.00022	....	....	
1, 138	115, 000	.00437	.00017	....	....	
1, 188	120, 000	.00455	.00018	....	....	
1, 237	125, 000	.00477	.00022	....	....	
1, 287	130, 000	.00494	.00017	....	....	
1, 336	135, 000	.00515	.00021	....	....	
1, 386	140, 000	.00536	.00021	....	....	
1, 435	145, 000	.00555	.00019	....	....	
1, 485	150, 000	.00576	.00021	....	....	Elastic limit.
1, 534	155, 000	.00608	.00032	....	....	
1, 584	160, 000	.00643	.00035	....	....	
1, 633	165, 000	.00770	.00123	....	....	
1, 683	170, 000	.01575	.00805	....	....	
1, 732	175, 000	.022	.00625	....	....	
1, 764	178, 180	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	178, 180
Elastic limit per square inch of original section	do...	150, 000
Elongation per inch after rupture	inch..	0. 021
Elongation per inch under strain at elastic limit	do...	.00576
Reduction in area after rupture, per centum of original section		46. 5
Position of rupture		1″.05 outside the gauged length
Character of broken surface		silky

No. 2595.

Dimensions, ″.0995 × ″.0997.
Sectional area, .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
99	10,000	.00033	.00033	....	....	
148	15,000	.00058	.00025	....	....	
198	20,000	.00078	.00020	....	....	
247	25,000	.00097	.00019	....	....	
297	30,000	.00114	.00017	....	....	
346	35,000	.00131	.00017	....	....	
396	40,000	.00154	.00023	....	....	
445	45,000	.00169	.00015	....	....	
495	50,000	.00188	.00019	....	....	
544	55,000	.00205	.00017	....	....	
594	60,000	.00221	.00016	....	....	
643	65,000	.00239	.00018	....	....	
693	70,000	.00258	.00019	....	....	
742	75,000	.00277	.00019	....	....	
792	80,000	.00292	.00015	....	....	
841	85,000	.00310	.00018	....	....	
891	90,000	.00328	.00018	....	....	
940	95,000	.00349	.00021	....	....	
990	100,000	.00369	.00020	....	....	
1,039	105,000	.00384	.00015	....	....	
1,089	110,000	.00403	.00019	....	....	
1,138	115,000	.00422	.00019	....	....	
1,188	120,000	.06441	.00019	....	....	
1,237	125,000	.00462	.00021	....	....	
1,287	130,000	.00482	.00020	....	....	
1,336	135,000	.00502	.00020	....	....	
1,386	140,000	.00521	.00019	....	....	
1,435	145,000	.00542	.00021	....	....	
1,485	150,000	.00569	.00027	....	....	Elastic limit.
1,534	155,000	.00600	.00031	....	....	
1,584	160,000	.00647	.00047	....	....	
1,633	165,000	.00765	.00118	....	....	
1,683	170,000	.01350	.00585	....	....	
1,732	175,000	.027	.0135	....	....	
1,780	179,800	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	179,800
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	0.030
Elongation per inch under strain at elastic limit	do...	.00569
Reduction in area after rupture, per centum of original section		49.5
Position of rupture		6″.7 outside the gauged length
Character of broken surface		silky

COIL No. 6—1.

When uncoiled the wires assumed a curve of 1″.00 V sine on a chord of 18″.

No. 2596.

Dimensions, ″.1000 × ″.1000.
Sectional area, .01 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	.00030	.00030	....	....	
150	15, 000	.00047	.00017	....	....	
200	20, 000	.00068	.00021	....	....	
250	25, 000	.00087	.00019	....	....	
300	30, 000	.00100	.00013	....	....	
350	35, 000	.00120	.00020	....	....	
400	40, 000	.00137	.00017	....	....	
450	45, 000	.00157	.00020	....	....	
500	50, 000	.00172	.00015	....	....	
550	55, 000	.00190	.00018	....	....	
600	60, 000	.00210	.00020	....	....	
650	65, 000	.00224	.00014	....	....	
700	70, 000	.00241	.00017	....	....	
750	75, 000	.00259	.00018	....	....	
800	80, 000	.00276	.00017	....	....	
850	85, 000	.00293	.00017	....	....	
900	90, 000	.00310	.00017	....	....	
950	95, 000	.00328	.00018	....	....	
1, 000	100, 000	.00345	.00017	....	....	
1, 050	105, 000	.00365	.00020	....	....	
1, 100	110, 000	.00383	.00018	....	....	
1, 150	115, 000	.00412	.00029	....	....	
1, 200	120, 000	.00428	.00016	....	....	
1, 250	125, 000	.00442	.00014	....	....	
1, 300	130, 000	.00459	.00017	....	....	
1, 350	135, 000	.00476	.00017	....	....	
1, 400	140, 000	.00494	.00018	....	....	
1, 450	145, 000	.00512	.00018	....	....	
1, 500	150, 000	.00532	.00020	....	....	
1, 550	155, 000	.00557	.00025	....	....	
1, 600	160, 000	.00578	.00021	....	....	
1, 650	165, 000	.00598	.00020	....	....	Elastic limit.
1, 700	170, 000	.00630	.00032	....	....	
1, 750	175, 000	.00810	.00180	....	....	
1, 800	180, 000	.018	.0099	....	....	
1, 842	184, 200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	184, 200
Elastic limit per square inch of original section........do...	165, 000
Elongation per inch after rupture........inch..	0.018
Elongation per inch under strain at elastic limit........do...	.00598
Reduction in area after rupture, per centum of original section........	45.0
Position of rupture........	6″.6 outside the gauged length
Character of broken surface........	silky

No. 2597.

Dimensions, ″.1000 × ″.1000.
Sectional area, .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	.00024	.00024	----------	----------	
150	15, 000	.00044	.00020	----------	----------	
200	20, 000	.00064	.00020	----------	----------	
250	25, 000	.00084	.00020	----------	----------	
300	30, 000	.00104	.00020	----------	----------	
350	35, 000	.00119	.00015	----------	----------	
400	40, 000	.00134	.00015	0.	----------	
450	45, 000	.00156	.00022	----------	----------	
500	50, 000	.00171	.00015	----------	----------	
550	55, 000	.00190	.00019	----------	----------	
600	60, 000	.00205	.00015	0.	----------	
650	65, 000	.00225	.00020	----------	----------	
700	70, 000	.00245	.00020	----------	----------	
750	75, 000	.00263	.00018	----------	----------	
800	80, 000	.00276	.00013	0.	----------	
850	85, 000	.00291	.00015	----------	----------	
900	90, 000	.00308	.00017	----------	----------	
950	95, 000	.00326	.00018	----------	----------	
1, 000	100, 000	.00345	.00019	0.	----------	
1, 050	105, 000	.00365	.00020	----------	----------	
1, 100	110, 000	.00385	.00020	----------	----------	
1, 150	115, 000	.00400	.00015	----------	----------	
1, 200	120, 000	.00418	.00018	.00006	.00006	
1, 250	125, 000	.00440	.00022	----------	----------	
1, 300	130, 000	.00456	.00016	----------	----------	
1, 350	135, 000	.00476	.00020	----------	----------	
1, 400	140, 000	.00495	.00019	.00011	.00005	
1, 450	145, 000	.00516	.00021	----------	----------	
1, 500	150, 000	.00536	.00020	----------	----------	
1, 550	155, 000	.00563	.00027	----------	----------	
1, 600	160, 000	.00583	.00020	.00025	.00014	Elastic limit.
1, 650	165, 000	.00616	.00033	----------	----------	
1, 700	170, 000	.00670	.00054	----------	----------	
1, 750	175, 000	.01090	.00420	----------	----------	
1, 800	180, 000	.022	.0111	----------	----------	
1, 828	182, 800	----------	----------	----------	----------	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	182, 800
Elastic limit per square inch of original section	do...	160, 000
Elongation per inch after rupture	inch..	0. 020
Elongation per inch under strain at elastic limit	do...	.00583
Reduction in area after rupture, per centum of original section		45. 0
Position of rupture		3″ outside the gauged length
Character of broken surface		silky

No. 2598.

Dimensions, ″.1000 × ″.1000.
Sectional area, .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	.00032	.00032	....	....	
150	15, 000	.00052	.00020	....	....	
200	20, 000	.00071	.00019	....	....	
250	25, 000	.00088	.00017	....	....	
300	30, 000	.00106	.00018	....	....	
350	35, 000	.00127	.00021	....	....	
400	40, 000	.00147	.00020	....	....	
450	45, 000	.00162	.00015	....	....	
500	50, 000	.00178	.00016	....	....	
550	55, 000	.00196	.00018	....	....	
600	60, 000	.00212	.00016	....	....	
650	65, 000	.00229	.00017	....	....	
700	70, 000	.00247	.00018	....	....	
750	75, 000	.00267	.00020	....	....	
800	80, 000	.00282	.00015	....	....	
850	85, 000	.00300	.00018	....	....	
900	90, 000	.00317	.00017	....	....	
950	95, 000	.00336	.00019	....	....	
1, 000	100, 000	.00350	.00014	....	....	
1, 050	105, 000	.00374	.00024	....	....	
1, 100	110, 000	.00391	.00017	....	....	
1, 150	115, 000	.00411	.00020	....	....	
1, 200	120, 000	.00430	.00019	....	....	
1, 250	125, 000	.00450	.00020	....	....	
1, 300	130, 000	.00470	.00020	....	....	
1, 350	135, 000	.00490	.00020	....	....	
1, 400	140, 000	.00510	.00020	....	....	
1, 450	145, 000	.00530	.00020	....	....	
1, 500	150, 000	.00550	.00020	....	....	
1, 550	155, 000	.00570	.00020	....	....	
1, 600	160, 000	.00597	.00027	....	....	Elastic limit.
1, 650	165, 000	.00635	.00038	....	....	
1, 700	170, 000	.00800	.00165	....	....	
1, 750	175, 000	.021	.0013	....	....	Tensile strength.

General summary.

Eensile strength per square inch of original section..............pounds..	175, 000
Elastic limit per square inch of original section..............do...	160, 000
Elongation per inch after rupture..............inch..	0. 006
Rlongation per inch under strain at elastic limit..............do...	.00597
Peduction in area after rupture, per centum of original section..............	41. 0
Cosition of rupture..............	8″.8 outside the gauged length
Tharacter of broken surface..............	silky

COIL NO. 4. TINNED.

Wire straightened between rolls before testing.

No. 2599.

Dimensions, ″.1010 × ″.1008.
Sectional area, .0102 square inch.
Gauged length 10.″

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00041	.00041	....	....	
153	15, 000	.00061	.00020	....	....	
204	20, 000	.00081	.00020	....	....	
255	25, 000	.00101	.00020	....	....	
306	30, 000	.00119	.00018	....	....	
357	35, 000	.00139	.00020	....	....	
408	40, 000	.00159	.00020	0.	....	
459	45, 000	.00180	.00021	....	....	
510	50, 000	.00196	.00016	....	....	
561	55, 000	.00217	.00021	....	....	
612	60, 000	.00236	.00019	.00008	.00008	
663	65, 000	.00260	.00024	....	....	
714	70, 000	.00276	.00016	....	....	
765	75, 000	.00296	.00020	....	....	
816	80, 000	.00317	.09021	.00022	.00014	
867	85, 000	.00343	.00026	....	....	
918	90, 000	.00363	.00020	....	....	
969	95, 000	.00386	.00023	....	....	
1, 020	100, 000	.00412	.00026	.00050	.00028	
1, 071	105, 000	.00442	.00030	....	....	
1, 122	110, 000	.00465	.00023	....	....	Elastic limit.
1, 173	115, 000	.00497	.00032	....	....	
1, 224	120, 000	.00533	.00036	.00085	.00035	
1, 275	125, 000	.00579	.00046	....	....	
1, 326	130, 000	.00607	.00028	....	....	
1, 377	135, 000	.00675	.00068	....	....	
1, 428	140, 000	.00754	.00079	.00230	.00145	
1, 479	145, 000	.009	.00146	....	....	
1, 530	150, 000	.010	.001	....	....	
1, 581	155, 000	.013	.003	....	....	
1, 632	160, 000	.026	.013	....	....	
1, 648	161, 570	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	161, 570
Elastic limit per square inch of original section .... do...	110, 000
Elongation per inch after rupture .... inch..	0. 027
Elongation per inch under strain at elastic limit .... do...	.00465
Reduction in area after rupture, per centum of original section	32. 4
Position of rupture	″.75 outside the gauged length
Character of broken surface	silky

No. 2600.

Dimensions, ″.1010 × ″.1008.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00035	.00035	....	....	
153	15, 000	.00057	.00022	....	....	
204	20, 000	.00077	.00020	....	....	
255	25, 000	.00092	.00015	....	....	
306	30, 000	.00112	.00020	....	....	
357	35, 000	.00132	.00020	....	....	
408	40, 000	.00152	.00020	....	....	
459	45, 000	.00170	.00018	....	....	
510	50, 000	.00188	.00018	....	....	
561	55, 000	.00207	.00019	....	....	
612	60, 000	.00227	.00020	....	....	
663	65, 000	.00243	.00016	....	....	
714	70, 000	.00263	.00020	....	....	
765	75, 000	.00292	.00029	....	....	
816	80, 000	.00308	.00016	....	....	
867	85, 000	.00326	.00018	....	....	
918	90, 000	.00347	.00021	....	....	
969	95, 000	.00370	.00023	....	....	
1, 020	100, 000	.00391	.00021	....	....	
1, 071	105, 000	.00417	.00026	....	....	Elastic limit.
1, 122	110, 000	.00448	.00031	....	....	
1, 173	115, 000	.00476	.00028	....	....	
1, 224	120, 000	.00506	.00030	....	....	
1, 275	125, 000	.00555	.00049	....	....	
1, 326	130, 000	.00600	.00045	....	....	
1, 377	135, 000	.00655	.00055	....	....	
1, 428	140, 000	.00713	.00058	....	....	
1, 479	145, 000	.00830	.00117	....	....	
1, 530	150, 000	.01020	.00190	....	....	
1, 581	155, 000	.013	.00280	....	....	
1, 632	160, 000	.027	.014	....	....	
1, 646	161, 370	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....pounds..	161, 370
Elastic limit per square inch of original section....do...	105, 000
Elongation per inch after rupture....inch..	0. 022
Elongation per inch under strain at elastic limit....do...	.00417
Reduction in area after rupture, per centum of orginal section....	37. 3
Position of rupture....	2″ inside the gauged length
Character of broken surface....	silky

No. 2601.

Dimensions, ″.1010 × ″.1008.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00023	.00023	....	....	
153	15, 000	.00050	.00027	....	....	
204	20, 000	.00071	.00021	....	....	
255	25, 000	.00088	.00017	....	....	
306	30, 000	.00104	.00016	....	....	
357	35, 000	.00121	.00017	....	....	
408	40, 000	.00141	.00020	....	....	
459	45, 000	.00160	.00019	....	....	
510	50, 000	.00181	.00021	....	....	
561	55, 000	.00199	.00018	....	....	
612	60, 000	.00218	.00019	....	....	
663	65, 000	.00239	.00021	....	....	
714	70, 000	.00260	.00021	....	....	
765	75, 000	.00280	.00020	....	....	
816	80, 000	.00300	.00020	....	....	
867	85, 000	.00321	.00021	....	....	
918	90, 000	.00345	.00024	....	....	
969	95, 000	.00370	.00025	....	....	
1, 020	100, 000	.00390	.00020	....	....	
1, 071	105, 000	.00419	.00029	....	....	
1, 122	110, 000	.00443	.00024	....	....	Elastic limit.
1, 173	115, 000	.00478	.00035	....	....	
1, 224	120, 000	.00511	.00033	....	....	
1, 275	125, 000	.00550	.00039	....	....	
1, 326	130, 000	.00600	.00050	....	....	
1, 377	135, 000	.00665	.00065	....	....	
1, 428	140, 000	.00758	.00093	....	....	
1, 479	145, 000	.00890	.00132	....	....	
1, 530	150, 000	.01120	.00230	....	....	
1, 581	155, 000	.018	.0068	....	....	
1, 622	159, 020	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	159, 020
Elastic limit per square inch of original section....................do...	110, 000
Elongation per inch after rupture....................inch..	0. 020
Elongation per inch under strain at elastic limit....................do...	.00443
Reduction in area after rupture, per centum of original section....................	37. 3
Position of rupture	″.1 outside the gauged length
Character of broken surface....................	silky

COIL NO. 3. TINNED.

Wires straightened between rolls before testing.

No. 2602.

Dimensions, ″.1014 × ″.1007.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00019	.00019	....	....	
153	15, 000	.00052	.00033	....	....	
204	20, 000	.00074	.00022	....	....	
255	25, 000	.00097	.00023	....	....	
306	30, 000	.00110	.00013	....	....	
357	35, 000	.00136	.00026	....	....	
408	40, 000	.00152	.00016	0.	....	
459	45, 000	.00174	.00022	....	....	
510	50, 000	.00196	.00022	....	....	
561	55, 000	.00211	.00015	....	....	
612	60, 000	.00237	.00026	0.	....	
663	65, 000	.00260	.00023	....	....	
714	70, 000	.00286	.00026	....	....	
765	75, 000	.00312	.00026	....	....	
816	80, 000	.00334	.00022	.00020	.00020	
867	85, 000	.00356	.00022	....	....	
918	90, 000	.00394	.00038	....	....	
969	95, 000	.00420	.00026	....	....	
1, 020	100, 000	.00446	.00026	.00061	.00041	Elastic limit.
1, 071	105, 000	.00477	.00031	....	....	
1, 122	110, 000	.00516	.00039	....	....	
1, 173	115, 000	.00558	.00042	....	....	
1, 224	120, 000	.00610	.00052	.00130	.00069	
1, 275	125, 000	.00660	.00050	....	....	
1, 326	130, 000	.00718	.00058	....	....	
1, 377	135, 000	.00796	.00078	....	....	
1, 428	140, 000	.00905	.00109	.00322	.00192	
1, 479	145, 000	.012	.00295	....	....	
1, 530	150, 000	.015	.003	....	....	
1, 581	155, 000	.019	.004	....	....	
1, 598	156, 670	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	156, 670
Elastic limit per square inch of original section	do	100, 000
Elongation per inch after rupture	inch	0. 020
Elongation per inch under strain at elastic limit	do	.00446
Reduction in area after rupture, per centum of original section		30. 4
Position of rupture		″.5 inside the gauged length
Character of broken surface		silky

No. 2603.

Dimensions, ″.1014 × ″.1007.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
102	10,000	.00028	.00028	....	....	
153	15,000	.00046	.00018	....	....	
204	20,000	.00066	.00020	....	....	
255	25,000	.00088	.00022	....	....	
306	30,000	.00107	.00019	....	....	
357	35,000	.00126	.00019	....	....	
408	40,000	.00143	.00017	....	....	
459	45,000	.00168	.00025	....	....	
510	50,000	.00188	.00020	....	....	
561	55,000	.00208	.00020	....	....	
612	60,000	.00228	.00020	....	....	
663	65,000	.00250	.00022	....	....	
714	70,000	.00273	.00023	....	....	
765	75,000	.00294	.00021	....	....	
816	80,000	.00316	.00022	....	....	
867	85,000	.00349	.00033	....	....	
918	90,000	.00379	.00030	....	....	
969	95,000	.00403	.00024	....	....	
1,020	100,000	.00432	.00029	....	....	Elastic limit.
1,071	105,000	.00466	.00034	....	....	
1,122	110,000	.00501	.00035	....	....	
1,173	115,000	.00535	.00034	....	....	
1,124	120,000	.00588	.00053	....	....	
1,275	125,000	.00628	.00040	....	....	
1,326	130,000	.00683	.00055	....	....	
1,377	135,000	.00750	.00067	....	....	
1,428	140,000	.00840	.00090	....	....	
1,479	145,000	.00963	.00123	....	....	
1,530	150,000	.01131	.00168	....	....	
1,581	155,000	.014	.00269	....	....	
1,607	157,550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	157,550
Elastic limit per square inch of original section ....do...	100,000
Elongation per inch after rupture............inch..	0.016
Elongation per inch under strain at elastic limit ....do...	.00432
Reduction in area after rupture, per centum of original section	37.3
Position of rupture	2″.35 inside the gauged length
Character of broken surface	silky

No. 2604.

Dimensions, ″.1014 × ″.1007.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00026	.00026	....	....	
153	15, 000	.00056	.00030	....	....	
204	20, 000	.00071	.00015	....	....	
255	25, 000	.00091	.00020	....	....	
306	30, 000	.00113	.00022	....	....	
357	35, 000	.00131	.00018	....	....	
408	40, 000	.00151	.00020	....	....	
459	45, 000	.00169	.00018	....	....	
510	50, 000	.00191	.00022	....	....	
561	55, 000	.00216	.00025	....	....	
612	60, 000	.00231	.00015	....	....	
663	65, 000	.00247	.00016	....	....	
714	70, 000	.00272	.00025	....	....	
765	75, 000	.00291	.00019	....	....	
816	80, 000	.00320	.00029	....	....	
867	85, 000	.00342	.00022	....	....	
918	90, 000	.00367	.00025	....	....	
969	95, 000	.00391	.00024	....	....	
1, 020	100, 000	.00413	.00022	....	....	Elastic limit.
1, 071	105, 000	.00445	.00032	....	....	
1, 122	110, 000	.00478	.00033	....	....	
1, 173	115, 000	.00508	.00030	....	....	
1, 224	120, 000	.00543	.00035	....	....	
1, 275	125, 000	.00585	.00042	....	....	
1, 326	130, 000	.00641	.00056	....	....	
1, 377	135, 000	.00693	.00052	....	....	
1, 428	140, 000	.00773	.00080	....	....	
1, 479	145, 000	.00868	.00095	....	....	
1, 530	150, 000	.010	.00132	....	....	
1, 581	155, 000	.012	.002	....	....	
1, 628	159, 610	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	159, 610
Elastic limit per square inch of original section	do	100, 000
Elongation per inch after rupture	inch	0. 010
Elongation per inch under strain at elastic limit	do	.00413
Reduction in area after rupture, per centum of original section		39. 2
Position of rupture		at one end of gauged length
Character of broken surface		silky

COIL NO. 2. NOT TINNED.

Samples which were taken from the section between the die plate and winding reel, and are nearly straight.

No. 2605.

Dimensions, ″.1012 × ″.1010.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00025	.00025			
153	15, 000	.00040	.00015			
204	20, 000	.00059	.00019			
255	25, 000	.00079	.00020			
306	30, 000	.00098	.00019			
357	35, 000	.00117	.00019			
408	40, 000	.00135	.00018	0.		
459	45, 000	.00157	.00022			
510	50, 000	.00177	.00020			
561	55, 000	.00197	.00020			
612	60, 000	.00214	.00017	0.		
663	65, 000	.00237	.00023			
714	70, 000	.00255	.00018			
765	75, 000	.00273	.00018			
816	80, 000	.00296	.00023	.00005	.00005	
867	85, 000	.00323	.00027			
918	90, 000	.00349	.00026			
969	95, 000	.00370	.00021			Elastic limit.
1, 020	100, 000	.00399	.00029	.00027	.00022	
1, 071	105, 000	.00432	.00033			
1, 122	110, 000	.00468	.00036			
1, 173	115, 000	.00498	.00030			
1, 224	120, 000	.00539	.00041	.00074	.00047	
1, 275	125, 000	.00592	.00053			
1, 326	130, 000	.00637	.00045			
1, 377	135, 000	.00705	.00068			
1, 428	140, 000	.00787	.00082	.00218	.00144	
1, 479	145, 000	.00939	.00152			
1, 530	150, 000	.01185	.00246			
1, 570	153, 920					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	153, 920
Elastic limit per square inch of original section	do...	95, 000
Elongation per inch after rupture	inch..	0. 015
Elongation per inch under strain at elastic limit	do...	.00370
Reduction in area after rupture, per centum of original section		43. 1
Position of rupture		4″.3 outside the gauged length
Character of broken surface		silky

No. 2606.

Dimensions, ″.1012 × ″.1010.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
102	10,000	.00030	.00030	....	....	
153	15,000	.00047	.00017	....	....	
204	20,000	.00067	.00020	....	....	
255	25,000	.00089	.00022	....	....	
306	30,000	.00109	.00020	....	....	
357	35,000	.00127	.00018	....	....	
408	40,000	.00147	.00020	....	....	
459	45,000	.00172	.00025	....	....	
510	50,000	.00192	.00020	....	....	
561	55,000	.00207	.00015	....	....	
612	60,000	.00227	.00020	....	....	
663	65,000	.00246	.00019	....	....	
714	70,000	.00269	.00023	....	....	
765	75,000	.00288	.00019	....	....	
816	80,000	.00313	.00025	....	....	
867	85,000	.00333	.00020	....	....	
918	90,000	.00365	.00032	....	....	
969	95,000	.00392	.00027	....	....	
1,020	100,000	.00416	.00024	....	....	Elastic limit.
1,071	105,000	.00450	.00034	....	....	
1,122	110,000	.00477	.00027	....	....	
1,173	115,000	.00525	.00048	....	....	
1,224	120,000	.00568	.00043	....	....	
1,275	125,000	.00596	.00028	....	....	
1,326	130,000	.00657	.00061	....	....	
1,377	135,000	.00705	.00048	....	....	
1,428	140,000	.00785	.00080	....	....	
1,479	145,000	.00880	.00095	....	....	
1,530	150,000	.01080	.00200	....	....	
1,581	155,000	.016	.0052	....	....	
1,588	155,690	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	155,690
Elastic limit per square inch of original section	do	100,000
Elongation per inch after rupture	inch	0.020
Elongation per inch under strain at elastic limit	do	.00416
Reduction in area after rupture, per centum of original section		45.1
Position of rupture		1″.4 inside the gauged length
Character of broken surface		silky

No. 2607.

Diameter, ″.1012 × ″.1010.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
102	10,000	.00024	.00024	....	....	
153	15,000	.00044	.00020	....	....	
204	20,000	.00064	.00020	....	....	
255	25,000	.00084	.00020	....	....	
306	30,000	.00104	.00020	....	....	
357	35,000	.00124	.00020	....	....	
408	40,000	.00144	.00020	....	....	
459	45,000	.00164	.00020	....	....	
510	50,000	.00184	.00020	....	....	
561	55,000	.00202	.00020	....	....	
612	60,000	.00220	.00018	....	....	
663	65,000	.00245	.00025	....	....	
714	70,000	.00270	.00025	....	....	
765	75,000	.00287	.00017	....	....	
816	80,000	.00305	.00018	....	....	
867	85,000	.00328	.00023	....	....	
918	90,000	.00357	.00029	....	....	
969	95,000	.00380	.00023	....	....	
1,020	100,000	.00419	.00039	....	....	
1,071	105,000	.00445	.00026	....	....	Elastic limit.
1,122	110,000	.00483	.00038	....	....	
1,173	115,000	.00518	.00035	....	....	
1,224	120,000	.00565	.00047	....	....	
1,275	125,000	.00607	.00042	....	....	
1,326	130,000	.00662	.00055	....	....	
1,377	135,000	.00729	.00067	....	....	
1,428	140,000	.00823	.00094	....	....	
1,479	145,000	.00947	.00124	....	....	
1,530	150,000	.01212	.00265	....	....	
1,570	153,920	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	153,920
Elastic limit per square inch of original section .... do...	105,000
Elongation per inch after rupture .... inch..	0.019
Elongation per inch under strain at elastic limit .... do...	.00445
Reduction in area after rupture per centum, of original section	45.1
Position of rupture	3″.8 inside the gauged length
Character of broken surface	silky

COIL NO. 2.

Samples which had been coiled but straightened between rolls before testing.

No. 2608.

Dimensions, ″.1006 × ″.1006.
Sectional area, .0101 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
101	10,000	.00026	.00026			
151	15,000	.00049	.00023			
202	20,000	.00069	.00020			
252	25,000	.00089	.00020			
303	30,000	.00111	.00022			
353	35,000	.00130	.00019			
404	40,000	.00152	.00022	.00005	.00005	
454	45,000	.00172	.00020			
505	50,000	.00195	.00023			
555	55,000	.00213	.00018			
606	60,000	.00237	.00024	.00013	.00008	
656	65,000	.00263	.00026			
707	70,000	.00290	.00027			
757	75,000	.00306	.00016			
808	80,000	.00335	.00029	.00029	.00016	
858	85,000	.00363	.00028			
909	90,000	.00393	.00030			
959	95,000	.00424	.00031			
1,010	100,000	.00457	.00033	.00060	.00031	Elastic limit.
1,060	105,000	.00496	.00039			
1,111	110,000	.00527	.00031			
1,161	115,000	.00571	.00044			
1,212	120,000	.00629	.00058	.00143	.00083	
1,262	125,000	.00681	.00052			
1,313	130,000	.00737	.00056			
1,363	135,000	.00821	.00084			
1,414	140,000	.00936	.00115	.00353	.00210	
1,464	145,000	.013	.00364			
1,515	150,000	.017	.004			
1,560	154,460					Tensile strength.

General summary.

Tensile strength per square inch of original section……pounds..	154,460
Elastic limit per square inch of original section……do …	100,000
Elongation per inch after rupture……inch..	0.025
Elongation per inch under strain at elastic limit……do…	.00457
Reduction in area after rupture, per centum of original section……	45.5
Position of rupture……	1″.4 inside the gauged length
Character of broken surface……	silky

No. 2609.

Dimensions, ″.1006 × ″.1006.
Sectional area, .0101 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
101	10, 000	.00040	.00040	....	....	
151	15, 000	.00065	.00025	....	....	
202	20, 000	.00089	.00024	....	....	
252	25, 000	.00105	.00016	....	....	
303	30, 000	.00123	.00018	....	....	
355	35, 000	.00145	.00022	....	....	
404	40, 000	.00165	.00020	....	....	
454	45, 000	.00185	.00020	....	....	
505	50, 000	.00207	.00022	....	....	
555	55, 000	.00225	.00018	....	....	
606	60, 000	.00247	.00022	....	....	
656	65, 000	.00272	.00025	....	....	
707	70, 000	.00292	.00020	....	....	
757	75, 000	.00320	.00028	....	....	
808	80, 000	.00342	.00022	....	....	
858	85, 000	.00365	.00023	....	....	
909	90, 050	.00390	.00025	....	....	
959	95, 000	.00418	.00028	....	....	
1, 010	100, 000	.00454	.00036	....	....	
1, 060	105, 000	.00478	.00024	....	....	Elastic limit.
1, 111	110, 000	.00512	.00034	....	....	
1, 161	115, 000	.00552	.00040	....	....	
1, 212	120, 000	.00598	.00046	....	....	
1, 262	125, 000	.00645	.00047	....	....	
1, 313	130, 000	.00700	.00055	....	....	
1, 363	135, 000	.00760	.00060	....	....	
1, 414	140, 000	.00860	.00100	....	....	
1, 464	145, 000	.00960	.00100	....	....	
1, 515	150, 000	.01132	.00172	....	....	
1, 565	155, 000	.020	.00868	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	155, 000
Elastic limit per square inch of original section	do...	105, 000
Elongation per inch after rupture	inch..	0. 014
Elongation per inch under strain at elastic limit	do...	.00478
Reduction in area after rupture, per centum of original section		47. 5
Position of rupture		″.05 outside the gauged length
Character of broken surface		silky

No. 2610.

Dimensions, ″.1006 × ″.1006.
Sectional area, .0101 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	.0	.0	.0	.0	Initial load.
101	10, 000	.00032	.00032	....	....	
151	15, 000	.00052	.00020	....	....	
202	20, 000	.00078	.00026	....	....	
252	25, 000	.00096	.00018	....	....	
303	30, 000	.00117	.00021	....	....	
353	35, 000	.00135	.00018	....	....	
404	40, 000	.00160	.09025	....	....	
454	45, 000	.00177	.00017	....	....	
505	50, 000	.00198	.00021	....	....	
555	55, 000	.00218	.00020	....	....	
606	60, 000	.00238	.00020	....	....	
656	65, 000	.00270	.00032	....	....	
707	70, 000	.00294	.00024	....	....	
757	75, 000	.00320	.00026	....	....	
808	80, 000	.00340	.00020	....	....	
858	85, 000	.00360	.00020	....	....	
909	90, 000	.00390	.00030	....	....	
959	95, 000	.00411	.00021	....	....	Elastic limit.
1, 010	100, 000	.00448	.00037	....	....	
1, 060	105, 000	.00485	.00037	....	....	
1, 111	110, 000	.00520	.00035	....	....	
1, 161	115, 000	.00558	.00038	....	....	
1, 212	120, 000	.00600	.00042	....	....	
1, 262	125, 000	.00650	.00050	....	....	
1, 313	130, 000	.00710	.00060	....	....	
1, 363	135, 000	.00800	.00090	....	....	
1, 414	140, 000	.00900	.00100	....	....	
1, 464	145, 000	.01050	.00150	....	....	
1, 515	150, 000	.015	.00450	....	....	
1, 550	153, 470	....	....	....	....	Tensile strength.

General summary

Tensile strength per square inch of original section...........pounds..	153, 470
Elastic limit per square inch of original section...........do...	95, 000
Elongation per inch after rupture...........inch..	0. 022
Elongation per inch under strain at elastic limit...........do...	.00411
Reduction in area after rupture, per centum of original section...........	38. 6
Position of rupture...........	″.85 inside the gauged length
Character of broken surface...........	silky

COIL No. 1. GALVANIZED.

Wires straightened between rolls before testing.

No. 2611.

Dimensions, ″.1010 × ″.1010.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00035	.00035	....	....	
153	15, 000	.00053	.00018	....	....	
204	20, 000	.00071	.00018	....	....	
255	25, 000	.00092	.00021	....	....	
306	30, 000	.00110	.00018	....	....	
357	35, 000	.00130	.00020	....	....	
408	40, 000	.00150	.00020	0.	....	
459	45, 000	.00169	.00019	....	....	
510	50, 000	.00186	.00017	....	....	
561	55, 000	.00206	.00020	....	....	
612	60, 000	.00226	.00020	0.	....	
603	65, 000	.00246	.00020	....	....	
714	70, 000	.00274	.00028	....	....	
765	75, 000	.00295	.00021	....	....	
816	80, 000	.00320	.00025	.00032	.00032	
867	85, 000	.00349	.00029	....	....	
918	90, 000	.00376	.00027	....	....	Elastic limit.
969	95, 000	.00408	.00032	....	....	
1, 020	100, 000	.00443	.00035	.00068	.00036	
1, 071	105, 000	.00495	.00052	....	....	
1, 122	110, 000	.00540	.00045	....	....	
1, 173	115, 000	.00611	.00071	....	....	
1, 224	120 000	.00722	.00111	.00260	.00192	
1, 275	125, 000	.00890	.00168	....	....	
1, 326	130, 000	.01123	.00233	....	....	
1, 377	135, 000	.014	.00277	....	....	
1, 428	140, 000	.022	.008	....	....	
1, 479	145, 000	.027	.005	....	....	
1, 530	150, 000	.041	.014	....	....	
1, 544	151, 370	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	151, 370
Elastic limit per square inch of original section	do	90, 000
Elongation per inch after rupture	inch	0. 035
Elongation per inch under strain at elastic limit	do	. 00376
Reduction in area after rupture, per centum of original section		35. 3
Position of rupture		2″. 8 outside the gauged length
Character of broken surface		silky

No. 2612.

Dimensions, ″.1010 × ″.1010.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00025	.00025	....	....	
153	15, 000	.00048	.00023	....	....	
204	20, 000	.00064	.00016	....	....	
255	25, 000	.00081	.00017	....	....	
306	30, 000	.00105	.00024	....	....	
357	35, 000	.00118	.00013	....	....	
408	40, 000	.00144	.00026	....	....	
459	45, 000	.00160	.00016	....	....	
510	50, 000	.00177	.00017	....	....	
561	55, 000	.00196	.00019	....	....	
612	60, 000	.00220	.00024	....	....	
663	65, 000	.00237	.00017	....	....	
714	70, 000	.00262	.00025	....	....	
765	75, 000	.00286	.00024	....	....	
816	80, 000	.00308	.00022	....	....	Elastic limit.
867	85, 000	.00340	.00032	....	....	
918	90, 000	.00376	.00036	....	....	
969	95, 000	.00405	.00029	....	....	
1, 020	100, 000	.00442	.00037	....	....	
1, 071	105, 000	.00497	.00055	....	....	
1, 122	110, 000	.00567	.00070	....	....	
1, 173	115, 000	.00665	.00098	....	....	
1, 224	120, 000	.00825	.00160	....	....	
1, 275	125, 000	.01080	.00255	....	....	
1, 326	130, 000	.01480	.00400	....	....	
1, 377	135, 000	.020	.00520	....	....	
1, 428	140, 000	.025	.005	....	....	
1, 479	145, 000	.039	.014	....	....	
1, 518	148, 820	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	148, 820
Elastic limit per square inch of original section	do...	80, 000
Elongation per inch after rupture	inch..	0. 058
Elongation per inch under strain at elastic limit	do...	.00308
Reduction in area after rupture, per centum of original section		42. 2
Position of rupture		2″.7 inside the gauged length
Character of broken surface		silky

No. 2613.

Dimensions, ″.1010 × ″.1010.
Sectional area, .0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00026	.00026	....	....	
153	15, 000	.00044	.00018	....	....	
204	20, 000	.00060	.00022	....	....	
255	25, 000	.00084	.00018	....	....	
306	30, 000	.00102	.00018	....	....	
357	35, 000	.00122	.00020	....	....	
408	40, 000	.00145	.00023	....	....	
459	45, 000	.00160	.00015	....	....	
510	50, 000	.00182	.00022	....	....	
561	55, 000	.00201	.00019	....	....	
612	60, 000	.00222	.00021	....	....	
663	65, 000	.00242	.00020	....	....	
714	70, 000	.00268	.00026	....	....	
765	75, 000	.00292	.00024	....	....	
816	80, 000	.00314	.00022	....	....	
867	85, 000	.00342	.00028	....	....	
918	90, 000	.00371	.00029	....	....	Elastic limit.
969	95, 000	.00406	.00035	....	....	
1, 020	100, 000	.00450	.00044	....	....	
1, 071	105, 000	.00493	.00043	....	....	
1, 122	110, 000	.09555	.00062	....	....	
1, 173	115, 000	.00630	.00075	....	....	
1, 224	120, 000	.00760	.00130	....	....	
1, 275	125, 000	.00940	.00180	....	....	
1, 326	130, 000	.01225	.00285	....	....	
1, 377	135, 000	.01625	.00400	....	....	
1, 428	140, 000	.024	.00775	....	....	
1, 479	145, 000	.029	.005	....	....	
1, 530	150, 000	.044	.015	....	....	
1, 562	153, 140	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	153, 140
Elastic limit per square inch of original section .... do...	90, 000
Elongation per inch after rupture .... inch..	0. 049
Elongation per inch under strain at elastic limit .... do...	.00371
Reduction in area after rupture, per centum of original section	42. 2
Position of rupture	″.50 inside the gauged length
Character of broken surface	silky

THIRD LOT.

″.10 SQUARE TINNED STEEL WIRE.

No. 2779.

COIL NO. 1. WEIGHT, 28½ POUNDS.

Specimen from outside end of coil.
Sectional area, ″.1010 × ″.1006=.0101 square inch.
Gauged length, 10″.
Inside end measures, ″.1002 × ″.1002.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
101	10, 000	.00028	.00028	....	....	
152	15, 000	.00053	.00025	....	....	
202	20, 000	.00073	.00020	....	....	
253	25, 000	.00088	.00015	....	....	
303	30, 000	.00108	.00020	....	....	
354	35, 000	.00125	.00017	....	....	
404	40, 000	.00148	.00023	....	....	
455	45, 000	.00163	.00015	....	....	
505	50, 000	.00178	.00015	....	....	
556	55, 000	.00196	.00018	....	....	
606	60, 000	.00217	.00021	....	....	
657	65, 000	.00233	.00016	....	....	
707	70, 000	.00253	.00020	....	....	
758	75, 000	.00267	.00014	....	....	
808	80, 000	.00284	.00017	....	....	
859	85, 000	.00304	.00020	....	....	
909	90, 000	.00322	.00018	....	....	
960	95, 000	.00336	.00014	....	....	
1, 010	100, 000	.00352	.00016	....	....	
1, 061	105, 000	.00375	.00023	....	....	
1, 111	110, 000	.00393	.00018	....	....	
1, 162	115, 000	.00409	.00016	....	....	
1, 212	120, 000	.00425	.00016	....	....	
1, 263	125, 000	.00445	.00020	....	....	
1, 313	130, 000	.00465	.00020	....	....	
1, 364	135, 000	.00480	.00015	....	....	
1, 414	140, 000	.00497	.00017	....	....	
1, 465	145, 000	.00527	.00030	....	....	
1, 515	150, 000	.00540	.00013	....	....	
1, 566	155, 000	.00560	.00020	....	....	
1, 616	160, 000	.00582	.00022	....	....	Elastic limit.
1, 667	165, 000	.00614	.00032	....	....	
1, 717	170, 000	.00665	.00051	....	....	
1, 768	175, 000	.01115	.00450	....	....	
1, 818	180, 000	.01985	.00870	....	....	
1, 871	185, 250	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	185, 250
Elastic limit per square inch of original section	do...	160, 000
Elongation per inch under strain at elastic limit	inch..	0. 00582
Reduction in area after rupture, per centum of original section		56. 5
Character of broken surface		fine silky

No. 2780.

COIL NO. 2. WEIGHT, 37 POUNDS.

Specimen from inside end of coil.
Sectional area, ″.1000 × ″.1006 = .0100 square inch.
Outside end measures ″.0994 × ″.0995.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
100	10,000	.00022	.00022	....	....	
150	15,000	.00039	.00017	....	....	
200	20,000	.00057	.00018	....	....	
250	25,000	.00077	.00020	....	....	
300	30,000	.00097	.00020	....	....	
350	35,000	.00113	.00016	....	....	
400	40,000	.00132	.00019	....	....	
450	45,000	.00150	.00018	....	....	
500	50,000	.00165	.00015	....	....	
550	55,000	.00185	.00020	....	....	
600	60,000	.00203	.00018	....	....	
650	65,000	.00223	.00020	....	....	
700	70,000	.00240	.00017	....	....	
750	75,000	.00260	.00020	....	....	
800	80,000	.00278	.00018	....	....	
850	85,000	.00295	.00017	....	....	
900	90,000	.00317	.00022	....	....	
950	95,000	.00331	.00014	....	....	
1,000	100,000	.00351	.00020	....	....	
1,050	105,000	.00368	.00017	....	....	
1,100	110,000	.00388	.00020	....	....	
1,150	115,000	.00412	.00024	....	....	
1,200	120,000	.00429	.00017	....	....	
1,250	125,000	.00447	.00018	....	....	
1,300	130,000	.00467	.00020	....	....	
1,350	135,000	.00487	.00020	....	....	
1,400	140,000	.00510	.00023	....	....	
1,450	145,000	.00533	.00023	....	....	Elastic limit.
1,500	150,000	.00560	.00027	....	....	
1,550	155,000	.00594	.00034	....	....	
1,600	160,000	.00645	.00051	....	....	
1,650	165,000	.00765	.00120	....	....	
1,700	170,000	.01070	.00305	....	....	
1,750	175,000	.01590	.00520	....	....	
1,800	180,000	.022	.0061	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	180,000
Elastic limit per square inch of original section	do	145,000
Elongation per inch after rupture	inch	0.013
Elongation per inch under strain at elastic limit	do	.00533
Reduction in area after rupture, per centum of original section		36.0
Position of rupture		1″.4 outside gauged length
Character of broken surface		fine silky

No. 2781.

COIL NO. 3. WEIGHT, 31 POUNDS.

Outside end of coil.
Sectional area, ″.1003 × ″.1004=.0100 square inch.
Inside end measures ″.0996 × ″.0999.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
1,000	100,000	.00370	.00370	....	....	
1,050	105,000	.00388	.00018	....	....	
1,100	110,000	.00408	.00020	....	....	
1,150	115,000	.00430	.00022	....	....	
1,200	120,000	.00450	.00020	....	....	
1,250	125,000	.00468	.00018	....	....	
1,300	130,000	.00494	.00026	....	....	
1,350	135,000	.00508	.00014	....	....	
1,400	140,000	.00527	.00019	....	....	
1,450	145,000	.00547	.00020	....	....	
1,500	150,000	.00577	.00030	....	....	
1,550	155,000	.00599	.00022	....	....	
1,600	160,000	.00622	.00023	....	....	Elastic limit.
1,650	165,000	.00652	.00030	....	....	
1,700	170,000	.00698	.00046	....	....	
1,750	175,000	.00805	.00107	....	....	
1,798	179,800	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	179,800
Elastic limit per square inch of original section	do...	160,000
Elongation per inch after rupture	inch..	0.014
Elongation per inch under strain at elastic limit	do...	.00622
Reduction in area after rupture, per centum of original section		33.0
Position of rupture		8″ outside gauged section
Character of broken surface		fine silky

No. 2782.

COIL No. 4. WEIGHT, 71½ POUNDS.

Sample taken 100 feet from outside end.
Sectional area, ''.1010 × ''.1003 =.0101 square inch.
Inside end measures ''.0995 × ''.1001.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
1,010	100,000	.00353	.00353	....	....	
1,061	105,000	.00370	.00017	....	....	
1,111	110,000	.00390	.00020	....	....	
1,162	115,000	.00410	.00020	....	....	
1,212	120,000	.00428	.00018	....	....	
1,263	125,000	.00444	.00016	....	....	
1,313	130,000	.00467	.00023	....	....	
1,364	135,000	.00480	.00013	....	....	
1,414	140,000	.00500	.00020	....	....	
1,465	145,000	.00520	.00020	....	....	
1,515	150,000	.00538	.00018	....	....	
1,566	155,000	.00556	.00018	....	....	
1,616	160,000	.00572	.00016	....	....	
1,667	165,000	.00594	.00022	....	....	
1,717	170,000	.00618	.00024	....	....	
1,768	175,000	.00632	.00014	....	....	
1,818	180,000	.00654	.00022	....	....	
1,869	185,000	.00678	.00024	....	....	
1,919	190,000	.00700	.00022	....	....	Elastic limit.
1,970	195,000	.00728	.00028	....	....	
2,020	200,000	.00798	.00070	....	....	
2,071	205,000	.01340	.00542	....	....	
2,121	210,000	.022.	.0088	....	....	
2,146	212,480	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	212,480
Elastic limit per square inch of original section	do	190,000
Elongation per inch after rupture	inch	0.014
Elongation per inch under strain at elastic limit	do	.00700
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		1''.20 outside gauged section
Character of broken surface		fine silky

No. 2783.

COIL No. 5. WEIGHT, 25 POUNDS.

Inside end of coil.

Sectional area, ″.1020 × ″.1006 =.0102 square inch.

Gauged length, 10″.

Outside end measures ″.1000 × ″.1000.

Wraps or coils with difficulty over arbor of same diameter as its diagonal.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
1,020	100,000	.00356	.00356	....	....	
1,530	150,000	.00545	.00189	....	....	
1,581	155,000	.00560	.00015	....	....	
1,632	160,000	.00583	.00023	....	....	
1,683	165,000	.00603	.00020	....	....	
1,734	170,000	.00628	.00025	....	....	
1,785	175,000	.00652	.00024	....	....	Elastic limit.
1,836	180,000	.00682	.00030	....	....	
1,887	185,000	.00730	.00048	....	....	
1,938	190,000	.00922	.00192	....	....	
1,989	195,000	.013	.00378	....	....	
2,029	198,920	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	198,920
Elastic limit per square inch of original section	do	175,000
Elongation per inch after rupture	inch	0.008
Elongation per inch under strain at elastic limit	do	.00652
Reduction in area after rupture, per centum of original section		25.5
Position of rupture		2″.6 inside gauged section
Character of broken surface		fine silky

No. 2784.

COIL No. 6. WEIGHT, 29½ POUNDS.

Inside end of coil.
Sectional area, ″.1003 × ″.0997 = .0100 square inch.
Outside end measures same as inside.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00191	.00191	....	....	
1,000	100,000	.00373	.00182	....	....	
1,500	150,000	.00559	.00186	....	....	
1,550	155,000	.00582	.00023	....	....	
1,600	160,000	.00599	.00017	....	....	
1,650	165,000	.00618	.00019	....	....	
1,700	170,000	.00644	.00026	....	....	Elastic limit.
1,750	175,000	.00675	.00031	....	....	
1,800	180,000	.00815	.00140	....	....	
1,850	185,000	.011	.00285	....	....	
1,900	190,000	.024	.013	....	....	
1,920	192,000	.033	.009	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	192,000
Elastic limit per square inch of original section	do...	170,000
Elongation per inch after rupture	inch..	0.020
Elongation per inch under strain at elastic limit	do...	.00644
Reduction in area after rupture, per centum of original section		8.0
Position of rupture		2″.3 outside gauged section; oblique
Character of broken surface		silky

No. 2785.

COIL No. 7. WEIGHT, 47¾ POUNDS.

Outside end of coil.
Sectional area, ″.1013 × ″.1004 = .0105 square inch.
Inside end measures ″.0997 × ″.0994.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
52	5,000	0.	0.	0.	0.	Initial load.
525	50,000	.00182	.00182			
1,050	100,000	.00370	.00188			
1,575	150,000	.00560	.00190			
1,627	155,000	.00578	.00018			
1,680	160,000	.00600	.00022			
1,732	165,000	.00615	.00015			
1,785	170,000	.00640	.00025			
1,837	175,000	.00660	.00020			
1,890	180,000	.00682	.00022			
1,942	185,000	.00703	.00021			Elastic limit.
1.995	190,000	.00733	.00030			
2,047	195,000	.00782	.00049			
2,100	200,000	.00930	.00148			
2,152	205,000	.012	.00270			
2,205	210,000	.017	.005			
2,257	215,000	.021	.004			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	215,000
Elastic limit per square inch of original section	do	185,000
Elongation per inch after rupture	inch	0.015
Elongation per inch under strain at elastic limit	do	.00703
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		12½″ outside gauged section
Character of broken surface		fine silky

No. 2786.

COIL NO. 8. WEIGHT, 37¼ POUNDS.

Inside end of coil.
Sectional area, ″.1004 × ″.0997 =.0100 square inch.
Outside end measures ″.0997 × ″.1011.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
500	50, 000	.00179	.00179	....	....	
1, 000	100, 000	.00356	.00177	....	....	
1, 500	150, 000	.00545	.00189	....	....	
1, 550	155, 000	.00564	.00019	....	....	
1, 600	160, 000	.00582	.00018	....	....	
1, 650	165, 000	.00602	.00020	....	....	
1, 700	170, 000	.00622	.00020	....	....	
1, 750	175, 000	.00642	.00020	....	....	
1, 800	180, 000	.00662	.00020	....	....	
1, 850	185, 000	.00682	.00020	....	....	
1, 900	190, 000	.00703	.00021	....	....	Elastic limit.
1, 950	195, 000	.00732	.00029	....	....	
2, 000	200, 000	.00767	.00035	....	....	
2, 050	205, 000	.00843	.00076	....	....	
2, 100	210, 000	.009	.00057	....	....	
2, 150	215, 000	.013	.004	....	....	
2, 200	220, 000	.024	.011	....	....	
2, 224	222, 400	.028	.004	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	222, 400
Elastic limit per square inch of original section	do...	190, 000
Elongation per inch after rupture	inch..	0. 016
Elongation per inch under strain at elastic limit	do...	.00703
Reduction in area after rupture, per centum of original section		28. 0
Position of rupture		2″.15 outside gauged section
Character of broken surface		fine silky

No. 2787.

COIL NO. 9. WEIGHT, 36¼ POUNDS.

Outside end of coil.
Sectional area, ″.1005 × ″.0994 =.0100 square inch.
Inside end measures ″.1024 × ″.1007.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00182	.00182	....	....	
1,000	100,000	.00370	.00188	....	....	
1,500	150,000	.00556	.00186	....	....	
1,550	155,000	.00577	.00021	....	....	
1,600	160,000	.00593	.00016	....	....	
1,650	165,000	.00610	.00017	....	....	
1,700	170,000	.00630	.00020	....	....	
1,750	175,000	.00655	.00025	....	....	
1,800	180,000	.00670	.00015	....	....	
1,850	185,000	.00693	.00023	....	....	
1,900	190,000	.00720	.00027	....	....	Elastic limit.
1,950	195,000	.00755	.00035	....	....	
2,000	200,000	.00820	.00065	....	....	
2,050	205,000	.01080	.00260	....	....	
2,100	210,000	.013	.0022	....	....	
2,150	215,000	.019	.006	....	....	
2,193	219,300	.033	.014	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	219,300
Elastic limit per square inch of original section	do...	190,000
Elongation per inch after rupture	inch..	0.025
Elongation per inch under strain at elastic limit	do...	.00720
Reduction in area after rupture, per centum of original section		28.0
Position of rupture		2″ inside gauged section
Character of broken surface		fine silky

No. 2788.

COIL NO. 10. WEIGHT, 28½ POUNDS.

Inside end of coil.
Sectional area, ″.0997 × ″.0996 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00174	.00174	....	....	
990	100,000	.00350	.00176	....	....	
1,485	150,000	.00538	.00188	....	....	
1,535	155,000	.00558	.00020	....	....	
1,584	160,000	.00578	.00020	....	....	
1,634	165,000	.00598	.00020	....	....	
1,683	170,000	.00618	.00020	....	....	
1,733	175,000	.00643	.00025	....	....	Elastic limit.
1,782	180,000	.00671	.00028	....	....	
1,832	185,000	.00707	.00036	....	....	
1,881	190,000	.00865	.00158	....	....	
1,931	195,000	.013	.00435	....	....	
1,980	200,000	.021	.008	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..................................pounds.. 200,000
Elastic limit per square inch of original section..................................do... 175,000
Elongation per inch after rupture..................................inch.. 0.009
Elongation per inch under strain at elastic limit..................................do... .00643
Reduction in area after rupture, per centum of original section ....not computed
Position of rupture..................................6″ outside gauged section
Character of broken surface..................................fine silky

No. 2789.

COIL NO. 11. WEIGHT, 37¼ POUNDS.

Outside end of coil.
Sectional area, ″.1020 × ″.1016 = .0103 square inch.
Gauged length, 10″.
Inside end of coil measures ″.1008 × ″.1006.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
52	5,000	0.	0.	0.	0.	Initial load.
515	50,000	.00174	.00174	....	....	
1,030	100,000	.00360	.00186	....	....	
1,545	150,000	.00548	.00188	....	....	
1,597	155,000	.00568	.00020	....	....	
1,648	160,000	.00587	.00019	....	....	
1,700	165,000	.00607	.00020	....	....	
1,751	170,000	.00627	.00020	....	....	
1,803	175,000	.00648	.00021	....	....	
1,854	180,000	.00668	.00020	....	....	
1,906	185,000	.00688	.00020	....	....	
1,957	190,000	.00708	.00020	....	....	
2,009	195,000	.00728	.00020	....	....	Elastic limit.
2,060	200,000	.00767	.00039	....	....	
2,112	205,000	.00848	.00081	....	....	
2,163	210,000	.011	.00252	....	....	
2,215	215,000	.015	.004	....	....	
2,266	220,000	.026	.011	....	....	
2,288	222,140	.031	.005	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	222,140
Elastic limit per square inch of original section	do...	195,000
Elongation per inch after rupture	inch..	0.018
Elongation per inch under strain at elastic limit	do ..	.00728
Reduction in area after rupture, per centum of original section		not computed
Position of rupture		5″.8 outside gauged section
Character of broken surface		fine silky

No. 2790.

SPECIMEN FROM INSIDE END OF COIL NO. 11.

Sectional area, ″.1008 × ″.1006 = .0101 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
505	50, 000	.00187	.00187	....	....	
1, 010	100, 000	.00368	.00181	....	....	
1, 515	150, 000	.00550	.00182	....	....	
1, 566	155, 000	.00570	.00020	....	....	
1, 616	160, 000	.00590	.00020	....	....	
1, 667	165, 000	.00607	.00017	....	....	
1, 717	170, 000	.00627	.00020	....	....	
1, 768	175, 000	.00647	.00020	....	....	
1, 818	180, 000	.00667	.00020	....	....	
1, 869	185, 000	.00687	.00020	....	....	
1, 919	190, 000	.00707	.00020	....	....	Elastic limit.
1, 970	195, 000	.00737	.00030	....	....	
2, 020	200, 000	.00762	.00025	....	....	
2, 071	205, 000	.00816	.00054	....	....	
2, 121	210, 000	.01195	.00379	....	....	
2, 172	215, 000	.017	.00505	....	....	
2, 222	220, 000	.027	.010	....	....	
2, 239	221, 680	.031	.004	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	221, 680
Elastic limit per square inch of original section	do	190, 000
Elongation per inch after rupture	inch	0. 015
Elongation per inch under strain at elastic limit	do	.00707
Reduction in area after rupture, per centum of original section		36. 6
Position of rupture		16″ outside the gauged section
Character of broken surface		fine silky

No. 2791.

COIL NO. 12. WEIGHT, 32¼ POUNDS.

Inside end of coil.
Sectional area, ″.1002 × ″.0998 =.0100 square inch.
Outside end measures ″.1005 × ″.1008.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	
500	50,000	.00175	.00175	....	....	
1,000	100,000	.00356	.00181	....	....	
1,500	150,000	.00540	.00184	....	....	
1,550	155,000	.00558	.00018	....	....	
1,600	160,000	.00578	.00020	....	....	
1,650	165,000	.00597	.00019	....	....	
1,700	170,000	.00617	.00020	....	....	
1,750	175,000	.00637	.00020	....	....	
1,800	180,000	.00657	.00020	....	....	
1,850	185,000	.00677	.00020	....	....	
1,900	190,000	.00698	.00021	....	....	Elastic limit.
1,950	195,000	.00742	.00044	....	....	
2,000	200,000	.01110	.00368	....	....	
2,050	205,000	.016	.0049	....	....	
2,100	210,000	.032	.016	....	....	
2,108	210,800	.036	.004	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	210,800
Elastic limit per square inch of original section	do	190,000
Elongation per inch after rupture	inch	0.025
Elongation per inch under strain at elastic limit	do	.00698
Reduction in area after rupture, per centum of original section		39.0
Position of rupture		½″ outside gauged section
Character of broken surface		fine silky

No. 2792.

COIL NO. 13. WEIGHT, 59 POUNDS.

Taken 100 feet from outside end of coil.
Sectional area, ″.1021 × ″.1006 = .0102 square inch.
Inside end measures ″.1000 × ″.1006.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
510	50, 000	. 00181	. 00181	....	....	
1, 020	100, 000	. 00360	. 00179	....	....	
1, 530	150, 000	. 00557	. 00197	....	....	
1, 581	155, 000	. 00581	. 00024	....	....	
1, 632	160, 000	. 00607	. 00026	....	....	Elastic limit.
1, 683	165, 000	. 00641	. 00034	....	....	
1, 734	170, 000	. 00693	. 00052	....	....	
1, 785	175, 000	. 00781	. 00088	....	....	
1, 836	180, 000	. 01020	. 00239	....	....	
1, 887	185, 000	. 013	. 0028	....	....	
1, 918	188, 040	. 017	. 004	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	188, 040
Elastic limit per square inch of original section	do	160, 000
Elongation per inch after rupture	inch	0. 012
Elongation per inch under strain at elastic limit	do	. 00607
Reduction in area after rupture, per centum of original section		37. 3
Position of rupture		2″ inside the gauged section
Character of broken surface		fine silky

No. 2793.

COIL NO. 14. WEIGHT, 34$\frac{3}{4}$ POUNDS.

Inside end of coil.
Sectional area, ″.1011 × ″.1005 =.0101 square inch.
Outside end measures ″.0992 × ″.0996.
Gauged length, 10″.
Coils about its diagonal with difficulty. Sixth trial successful.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
505	50, 000	.00176	.00176	....	....	
1, 010	100, 000	.00361	.00185	....	....	
1, 515	150, 000	.00545	.00184	....	....	
1, 566	155, 000	.00560	.00015	....	....	
1, 616	160, 000	.00576	.00016	....	....	
1, 667	165, 000	.00598	.00022	....	....	
1, 717	170, 000	.00624	.00026	....	....	
1, 768	175, 000	.00638	.00014	....	....	
1, 818	180, 000	.00656	.00018	....	....	
1, 869	185, 000	.00677	.00021	....	....	
1, 919	190, 000	.00703	.00026	....	....	Elastic limit.
1, 970	195, 000	.00737	.00034	....	....	
2, 020	200, 000	.01013	.00276	....	....	
2, 071	205, 000	.014	.004	....	....	
2, 121	210, 000	.025	.011	....	....	
2, 152	213, 070	.032	.007	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	213, 070
Elastic limit per square inch of original section	do...	190, 000
Elongation per inch after rupture	inch..	0. 020
Elongation per inch under strain at elastic limit	do...	.00703
Reduction in area after rupture, per centum of original section		44. 6
Position of rupture		1″.6 outside the gauged section
Character of broken surface		fine silky

No. 2794.

COIL NO. 15. WEIGHT, 34 POUNDS.

Outside end of coil.
Sectional area, ″.0996 × ″.0996 =.0099 square inch.
Inside end measures ″.0998 × ″.0987.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00178	.00178	....	....	
990	100, 000	.00358	.00180	....	....	
1, 485	150, 000	.00547	.00189	....	....	
1, 534	155, 000	.00562	.00015	....	....	
1, 584	160, 000	.00584	.00022	....	....	
1, 633	165, 000	.00599	.00015	....	....	
1, 683	170, 000	.00627	.00028	....	....	
1, 732	175, 000	.00645	.00018	....	....	
1, 782	180, 000	.00661	.00016	....	....	
1, 831	185, 000	.00687	.00026	....	....	Elastic limit.
1, 881	190, 000	.00717	.00030	....	....	
1, 930	195, 000	.00800	.00083	....	....	
1, 980	200, 000	.01000	.00200	....	....	
2, 029	205, 000	.013	.003	....	....	
2, 079	210, 000	.017	.004	....	....	
2, 090	211, 110	.020	.003	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	211, 110
Elastic limit per square inch of original section	do	185, 000
Elongation per inch after rupture	inch	0. 007
Elongation per inch under strain at elastic limit	do	.00687
Reduction in area after rupture, per centum of original section		40. 4
Position of rupture		8″.3 outside gauged section
Character of broken surface		fine silky

No. 2795.

COIL No. 16. WEIGHT, 34 POUNDS.

Inside end of coil.
Sectional area, ″.0999×″.0990=.0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00182	.00182	....	....	
990	100,000	.00362	.00180	....	....	
1,485	150,000	.00541	.00179	....	....	
1,534	155,000	.00557	.00016	....	....	
1,584	160,000	.00577	.00020	....	....	
1,633	165,000	.00595	.00018	....	....	
1,683	170,000	.00614	.00019	....	....	
1,732	175,000	.00635	.00021	....	....	
1,782	180,000	.00660	.00025	....	....	
1,831	185,000	.00683	.00023	....	....	Elastic limit.
1,881	190,000	.00723	.00040	....	....	
1,930	195,000	.00905	.00182	....	....	
1,980	200,000	.013	.004	....	....	
2,029	205,000	.017	.004	....	....	
2,079	210,000	.034	.017	....	....	
2,093	211,410	.040	.006	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	211,410
Elastic limit per square inch of original section	do	185,000
Elongation per inch after rupture	inch	0.026
Elongation per inch under strain at elastic limit	do	.00683
Reduction in area after rupture, per centum of original section		37.4
Position of rupture		″.55 outside gauged section
Character of broken surface		fine silky

No. 2796.

COIL NO. 17. WEIGHT, 26¼ POUNDS.

Outside end of coil.
Sectional area, ″.0997 × ″.0997 =.0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00184	.00184	....	....	
990	100, 000	.00363	.00179	....	....	
1, 485	150, 000	.00543	.00180	....	....	
1, 534	155, 000	.00563	.00020	....	....	
1, 584	160, 000	.00583	.00020	....	....	
1, 633	165, 000	.00602	.00019	....	....	
1, 683	170, 000	.00618	.00016	....	....	
1, 732	175, 000	.00637	.00019	....	....	
1, 782	180, 000	.00657	.00020	....	....	
1, 831	185, 000	.00677	.00020	....	....	
1, 881	190, 000	.00698	.00021	....	....	
1, 930	195, 000	.00722	.00024	....	....	Elastic limit.
1, 980	200, 000	.00862	.00140	....	....	
2, 029	205, 000	.01365	.00503	....	....	
2, 079	210, 000	.024	.01035	....	....	
2, 110	213, 120	.034	.010	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	213, 120
Elastic limit per square inch of original section	do...	195, 000
Elongation per inch after rupture	inch..	0. 019
Elongation per inch under strain at elastic limit	do...	.00722
Reduction in area after rupture, per centum of original section		41. 4
Position of rupture		3″.85 outside the gauged section
Character of broken surface		fine silky

No. 2797.

COIL NO. 18. WEIGHT, 71¾ POUNDS.

Coil divided into two parts, weighing 29 pounds and 42¾ pounds respectively. Specimen taken from coil between the two parts.

Sectional area, ″.1000 × ″.1000 = .0100 square inch.

Gauged length, 10″.

Two corners of the wire of this coil rounded with about ″.02½ radius.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00183	.00183	....	....	
1,000	100,000	.00367	.00184	....	....	
1,500	150,000	.00553	.00186	....	....	
1,550	155,000	.00577	.00024	....	....	
1,600	160,000	.00597	.00020	....	....	
1,650	165,000	.00617	.00020	....	....	
1,700	170,000	.00642	.00025	....	....	Elastic limit.
1,750	175,000	.00672	.00030	....	....	
1,800	180,000	.00850	.00178	....	....	
1,850	185,000	.015	.00650	....	....	
1,900	190,000	.022	.007	....	....	
1,942	194,200	.031	.009	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	194,200
Elastic limit per square inch of original section	do...	170,000
Elongation per inch after rupture	inch..	0.017
Elongation per inch under strain at elastic limit	do...	.00642
Reduction in area after rupture, per centum of original section		42.0
Position of rupture		13″.6 outside the gauged length
Character of broken surface		fine silky

No. 2798.

Coil No. 19. Weight, 47¼ Pounds.

Specimen 100 feet from outside end of coil.
Inside end measures ″.0994 × ″.0992.
Sectional area, ″.0996 × ″.0996 = .0099 square inch.
Gauged length, 10″.
Two rounded corners, and two corners nearly square. Deep furrows scratched along one face.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00188	.00188	....	....	
990	100,000	.00380	.00192	....	....	
1,485	150,000	.00578	.00198	....	....	
1,534	155,000	.00602	.00024	....	....	
1,584	160,000	.00627	.00025	....	....	Elastic limit.
1,633	165,000	.00673	.00046	....	....	
1,683	170,000	.00869	.00196	....	....	
1,732	175,000	.01570	.00701	....	....	
1,771	178,890	.020	.00430	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	178,890
Elastic limit per square inch of original section	do	160,000
Elongation per inch after rupture	inch	0.007
Elongation per inch under strain at elastic limit	do	.00627
Reduction in area after rupture, per centum of original section		38.3
Position of rupture		9″.9 outside the gauged section
Character of broken surface		fine silky

No. 2799.

COIL No. 20. WEIGHT, 42¾ POUNDS.

Inside end of coil.
Sectional area, ″.1000 × ″.0986 =.0098 square inch.
Outside end measures ″.0990 × ″.1020.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
490	50,000	.00183	.00183			
980	100,000	.00368	.00185			
1,470	150,000	.00562	.00194			
1,519	155,000	.00585	.00023			Elastic limit.
1,568	160,000	.00613	.00028			
1,617	165,000	.00645	.00032			
1,666	170,000	.00697	.00052			
1,715	175,000	.00772	.00075			
1,764	180,000	.00875	.00103			
1,813	185,000	.01061	.00186			
1,862	190,000	.014	.00339			
1,875	191,330	,017	.003			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	191,330
Elastic limit per square inch of original section	do	155,000
Elongation per inch after rupture	inch	0.006
Elongation per inch under strain at elastic limit	do	.00585
Reduction in area after rupture, per centum of original section		39.8
Position of rupture		2″.75 outside the gauged section
Character of broken surface		fine silky

No. 2800.

COIL NO. 21. WEIGHT, 23¾ POUNDS.

Specimen from outside end of coil.
Sectional area, ″.1016 × ″.1026 =.0104 square inch.
Inside end measures ″.0995 × ″.0998.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
52	5,000	0.	0.	0.	0.	Initial load.
520	50,000	.00185	.00185	....	....	
1,040	100,000	.00376	.00191	....	....	
1,560	150,000	.00588	.00212	....	....	
1,612	155,000	.00610	.00022	....	....	
1,664	160,000	.00642	.00032	....	....	Elastic limit.
1,716	165,000	.00680	.00038	....	....	
1,768	170,000	.00755	.00075	....	....	
1,820	175,000	.00980	.00225	....	....	
1,872	180,000	.01513	.00533	....	....	
1,924	185,000	.020	.00487	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	185,000
Elastic limit per square inch of original section	do...	160,000
Elongation per inch after rupture	inch..	0.010
Elongation per inch under strain at elastic limit	do...	.00610
Reduction in area after rupture, per centum of original section		41.3
Position of rupture		7″ outside the gauged section
Character of broken surface		fine silky

No. 2801.

COIL NO. 22. WEIGHT, 33¼ POUNDS.

Inside end of coil.
Sectional area, ″.1002 × ″.0997=.0100 square inch.
Outside end measures ″.0996 × ″.0994.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00170	.00170	....	....	
1,000	100,000	.00350	.00180	....	....	
1,500	150,000	.00535	.00185	....	....	
1,550	155,000	.00553	.00018	....	....	
1,600	160,000	.00573	.00020	....	....	
1,650	165,000	.00593	.00020	....	....	
1,700	170,000	.00612	.00019	....	....	
1,750	175,000	.00632	.00020	....	....	
1,800	180,000	.00656	.00024	....	....	
1,850	185,000	.00674	.00018	....	....	Elastic limit.
1,900	190,000	.00702	.00028	....	....	
1,950	195,000	.00757	.00055	....	....	
2,000	200,000	.01450	.00693	....	....	
2,050	205,000	.026	.01150	....	....	
2,068	206,800	.034	.008	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section........pounds..	206,800
Elastic limit per square inch of original section........do...	185,000
Elongation per inch after rupture........inch..	0.026
Elongation per inch under strain at elastic limit........do...	.00674
Reduction in area after rupture, per centum of original section........	39.0
Position of rupture........	″.03 inside the gauged section
Character of broken surface........	fine silky

No. 2802.

COIL NO. 23. WEIGHT, 25¼ POUNDS.

Outside end of coil.
Sectional area, ″.0998 × ″.0992 = .0099 square inch.
Inside end measures ″.1004 × ″.0996.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00185	.00185			
990	100,000	.00378	.00193			
1,485	150,000	.00563	.00185			
1,534	155,000	.00581	.00018			
1,584	160,000	.00599	.00018			
1,633	165,000	.00620	.00021			
1,683	170,000	.00639	.00019			
1,732	175,000	.00659	.00020			
1,782	180,000	.00681	.00022			
1,831	185,000	.00709	.00028			Elastic limit.
1,881	190,000	.00752	.00043			
1,930	195,000	.01099	.00347			
1,980	200,000	.017	.00601			
2,029	205,000	.027	.010			
2,048	206,870	.033	.006			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	206,870
Elastic limit per square inch of original section	do	185,000
Elongation per inch after rupture	inch	0.018
Elongation per inch under strain at elastic limit	do	.00709
Reduction in area after rupture, per centum of original section		40.4
Position of rupture		7″ outside the gauged section
Character of broken surface		fine silky

No. 2803.

COIL NO. 24. WEIGHT, 34¼ POUNDS.

Inside end of coil.
Sectional area, ″.0994 × ″.0997 = .0099 square inch.
Outside end measures ″.1018 × ″.1017.
Gauged length, 10″.
Coils around its diagonal with difficulty.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00180	.00180			
990	100,000	.00371	.00191			
1,485	150,000	.00543	.00172			
1,534	155,000	.00567	.00024			
1,584	160,000	.00585	.00018			
1,633	165,000	.00606	.00021			
1,683	170,000	.00627	.00021			
1,732	175,000	.00647	.00020			
1,782	180,000	.00668	.00021			Elastic limit.
1,831	185,000	.00697	.00029			
1,881	190,000	.00733	.00036			
1,930	195,000	.00980	.00247			
1,980	200,000	.01660	.00680			
2,010	203,030	.023	.00640			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	203,030
Elastic limit per square inch of original section	do	180,000
Elongation per inch after rupture	inch	0.017
Elongation per inch under strain at elastic limit	do	.00668
Reduction in area after rupture, per centum of original section		9.1
Position of rupture		16″ outside gauged section
Character of broken surface		silky, irregular oblique

No. 2804.

COIL NO. 25. WEIGHT, 37½ POUNDS.

Outside end of coil.
Sectional area, ″.0995 × ″.0990 =.0098 square inch.
Inside end measures ″.1014 × ″.1002.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
490	50, 000	.00191	.00191	....	....	
980	100, 000	.00372	.00182	....	....	
1, 470	150, 000	.00560	.00188	....	....	
1, 519	155, 000	.00582	.00022	....	....	
1, 568	160, 000	.00600	.00018	....	....	
1, 617	165, 000	.00623	.00023	....	....	
1, 666	170, 000	.00648	.00025	....	....	Elastic limit.
1, 715	175, 000	.00676	.00028	....	....	
1, 764	180, 000	.00710	.00034	....	....	
1, 813	185, 000	.00752	.00042	....	....	
1, 862	190, 000	.00819	.00067	....	....	
1, 911	195, 000	.00960	.00141	....	....	
1, 960	200, 000	.01222	.00262	....	....	
2, 009	205, 000	.015	.00278	....	....	
2, 040	208, 160	.019	.004	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	208, 160
Elastic limit per square inch of original section	do...	170, 000
Elongation per inch after rupture	inch..	0. 012
Elongation per inch under strain at elastic limit	do...	.00648
Reduction in area after rupture, per centum of original section		40. 8
Position of rupture		2″.12 inside the gauged section
Character of broken surface		fine silky

No. 2805.

COIL NO. 26. WEIGHT, 39¼ POUNDS.

Inside end of coil.
Sectional area, ″.1003 × ″.0998 = .010 square inch.
Outside end measures ″.1016 × ″.1009.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00168	.00168	....	....	
1,000	100,000	.00352	.00184	....	....	
1,500	150,000	.00536	.00184	....	....	
1,550	155,000	.00550	.00014	....	....	
1,600	160,000	.00568	.00018	....	....	
1,650	165,000	.00587	.00019	....	....	
1,700	170,000	.00610	.00023	....	....	
1,750	175,000	.00628	.00018	....	....	
1,800	180,000	.00649	.00021	....	....	
1,850	185,000	.00670	.00021	....	....	
1,900	190,000	.00692	.00022	....	....	Elastic limit.
1,950	195,000	.00730	.00038	....	....	
2,000	200,000	.01240	.00510	....	....	
2,050	205,000	.014	.00160	....	....	
2,100	210,000	.028	.014	....	....	
2,102	210,200	.032	.004	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	210,200
Elastic limit per square inch of original section	do	190,000
Elongation per inch after rupture	inch	0.018
Elongation per inch under strain at elastic limit	do	.00692
Reduction in area after rupture, per centum of original section		42.0
Position of rupture		8″.9 outside the gauged section
Character of broken surface		fine silky

No. 2806.

COIL NO. 27. WEIGHT, 33½ POUNDS.

Specimen taken 100 feet from outside end of coil.
Sectional area, ″.1026 × ″.1016 =.0104 square inch.
Inside end of coil measures ″.1004 × ″.1006.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
52	5,000	0.	0.	0.	0.	Initial load.
520	50,000	.00179	.00179	....	....	
1,040	100,000	.00360	.00181	....	....	
1,560	150,000	.00545	.00185	....	....	
1,612	155,000	.00564	.00019	....	....	
1,664	160,000	.00586	.00022	....	....	
1,716	165,000	.00603	.00017	....	....	
1,768	170,000	.00625	.00022	....	....	
1,820	175,000	.00647	.00022	....	....	
1,872	180,000	.00667	.00020	....	....	
1,924	185,000	.00685	.00018	....	....	
1,976	190,000	.00708	.00023	....	....	Elastic limit.
2,028	195,000	.00745	.00037	....	....	
2,080	200,000	.00886	.00141	....	....	
2,132	205,000	.01410	.00524	....	....	
2,184	210,000	.020	.00590	....	....	
2,231	214,520	.034	.014	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	214,520
Elastic limit per square inch of original section ....do...	190,000
Elongation per inch after rupture ....inch..	0.020
Elongation per inch under strain at elastic limit ....do...	.00708
Reduction in area after rupture, per centum of original section	38.4
Position of rupture	8″.75 outside the gauged section
Character of broken surface	fine silky

No. 2807.

COIL NO. 28. WEIGHT, 25¼ POUNDS.

Inside end of coil.
Sectional area, ″.0988 × ″.0988 = .0098 square inch.
Outside end measures ″.0994 × ″.0996.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
490	50, 000	.00177	.00177	....	....	
980	100, 000	.00365	.00188	....	....	
1, 470	150, 000	.00549	.00184	....	....	
1, 519	155, 000	.00567	.00018	....	....	
1, 568	160, 000	.00587	.00020	....	....	
1, 617	165, 000	.00607	.00020	....	....	
1, 666	170, 000	.00630	.00023	....	....	
1, 715	175, 000	.00647	.00017	....	....	
1, 764	180, 000	.00666	.00019	....	....	
1, 813	185, 000	.00686	.00020	....	....	
1, 862	190, 000	.00708	.00022	....	....	
1, 911	195, 000	.00734	.00026	....	....	Elastic limit.
1, 960	200, 000	.00768	.00034	....	....	
2, 009	205, 000	.00854	.00086	....	....	
2, 058	210, 000	.01115	.00261	....	....	
2, 107	215, 000	.020	.00885	....	....	
2, 156	220, 000	.030	.010	....	....	
2, 178	222, 240	.043	.013	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	222, 240
Elastic limit per square inch of original section	do...	195, 000
Elongation per inch after rupture	inch..	0. 030
Elongation per inch under strain at elastic limit	do...	.00734
Reduction in area after rupture, per centum of original section		26. 5
Position of rupture		1″.35 inside the gauged section
Character of broken surface		fine silky

No. 2808.

COIL No. 29. WEIGHT, 30¾ POUNDS.

Outside end of coil.
Sectional area, ″.1004 × ″.1016 =.0102 square inch.
Inside end measures ″.1000 × ″.1004.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
510	50, 000	.00175	.00175	....	....	
1, 020	100, 000	.00362	.00187	....	....	
1, 530	150, 000	.00545	.00183	....	....	
1, 581	155, 000	.00562	.00017	....	....	
1, 632	160, 000	.00581	.00019	....	....	
1, 683	165, 000	.00600	.00019	....	....	
1, 734	170, 000	.00622	.00022	....	....	
1, 785	175, 000	.00639	.00017	....	....	
1, 836	180, 000	.00661	.00022	....	....	
1, 887	185, 000	.00683	.00022	....	....	Elastic limit.
1, 938	190, 000	.00710	.00027	....	....	
1, 989	195, 000	.00753	.00043	....	....	
2, 040	200, 000	.01200	.00447	....	....	
2, 091	205, 000	.019	.007	....	....	
2, 130	208, 820	.023	.004	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	208, 820
Elastic limit per square inch of original section	do	185, 000
Elongation per inch after rupture	inch	0. 010
Elongation per inch under strain at elastic limit	do	.00683
Reduction in area after rupture, per centum of original section		37. 3
Position of rupture		9″.5 outside the gauged section
Character of broken surface		fine silky

No. 2809.

COIL NO. 30. WEIGHT, 70¼ POUNDS.

Specimen taken near the middle of coil.
Sectional area, ''.1003 × ''.0998 = .010 square inch.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00174	.00174	....	....	
1,000	100,000	.00356	.00182	....	....	
1,500	150,000	.00537	.00187	....	....	
1,550	155,000	.00556	.00019	....	....	
1,600	160,000	.00577	.00021	....	....	
1,650	165,000	.00597	.00020	....	....	
1,700	170,000	.00620	.00023	....	....	
1,750	175,000	.00641	.00021	....	....	Elastic limit.
1,800	180,000	.00670	.00029	....	....	
1,850	185,000	.00710	.00040	....	....	
1,900	190,000	.00845	.00135	....	....	
1,950	195,000	.01350	.00505	....	....	
2,000	200,000	.017	.00350	....	....	
2,042	204,200	.026	.009	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	204,200
Elastic limit per square inch of original section	do	175,000
Elongation per inch after rupture	inch	0.012
Elongation per inch under strain at elastic limit	do	.00641
Reduction in area after rupture, per centum of original section		36.0
Position of rupture		9'' outside the gauged section
Character of broken surface		fine silky

No. 2810.

COIL No. 31. WEIGHT, 23½ POUNDS.

Inside end of coil.
Sectional area, ″.0996 × ″.0996 = .0099 square inch.
Gauged length, 10″.
Outside end measures same as inside end.
Surface of wire scored by deep grooves.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00183	.00183	....	....	
990	100, 000	.00371	.00188	....	....	
1, 485	150, 000	.00560	.00189	....	....	
1, 534	155, 000	.00580	.00020	....	....	
1, 584	160, 000	.00603	.00023	....	....	
1, 633	165, 000	.00627	.00024	....	....	
1, 683	170, 000	.00650	.00023	....	....	
1, 732	175, 000	.00676	.00026	....	....	Elastic limit.
1, 782	180, 000	.00717	.00041	....	....	
1, 831	185, 000	.00780	.00063	....	....	
1, 881	190, 000	.01087	.00307	....	....	
1, 930	195, 000	.015	.00413	....	....	
1, 980	200, 000	.020	.005	....	....	
2, 010	203, 030	.023	.003	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	203, 030
Elastic limit per square inch of original section	do	175, 000
Elongation per inch after rupture	inch	0. 018
Elongation per inch under strain at elastic limit	do	.00676
Reduction in area after rupture, per centum of original section		33. 3
Position of rupture		2″.1 inside the gauged section
Character of broken surface		fine silky

No. 2811.

COIL NO. 32. WEIGHT, 29¼ POUNDS.

Outside end of coil.
Sectional area, ″.1000 × ″.1000 =.010 square inch.
Inside end measures ″.1000 × ″.1006.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
500	50, 000	.00183	.00183	....	....	
1, 000	100, 000	.00374	.00191	....	....	
1, 500	150, 000	.00555	.00181	....	....	
1, 550	155, 000	.00577	.00022	....	....	
1, 600	160, 000	.00595	.00018	....	....	
1, 650	165, 000	.00615	.00020	....	....	
1, 700	170, 000	.00635	.00020	....	....	
1, 750	175, 000	.00660	.00025	....	....	
1, 800	180, 000	.00680	.00020	....	....	Elastic limit.
1, 850	185, 000	.00715	.00035	....	....	
1, 900	190, 000	.00765	.00050	....	....	
1, 950	195, 000	.00875	.00110	....	....	
2, 000	200, 000	.01110	.00235	....	....	
2, 050	205, 000	.018	.00690	....	....	
2, 100	210, 000	.025	.007	....	....	
2, 111	211, 100	.030	.005	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	211, 100
Elastic limit per square inch of original section	do	180, 000
Elongation per inch after rupture	inch	0. 021
Elongation per inch under strain at elastic limit	do	.00680
Reduction in area after rupture, per centum of original section		44. 0
Position of rupture		″.75 inside the gauged section
Character of broken surface		fine silky

No. 2812.

COIL NO. 33. WEIGHT, 69¾ POUNDS.

Specimen taken 100 feet from outside end of coil.
Sectional area, ″.1002 × ″.0997 =.010 square inch.
Inside end measures ″.1008 × ″.1002.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
500	50, 000	.00182	.00182	....	....	
1, 000	100, 000	.00371	.00189	....	....	
1, 500	150, 000	.00544	.00173	....	....	
1, 550	155, 000	.00565	.00021	....	....	
1, 600	160, 000	.00586	.00021	....	....	
1, 650	165, 000	.00607	.00021	....	....	
1, 700	170, 000	.00627	.00020	....	....	
1, 750	175, 000	.00645	.00018	....	....	
1, 800	180, 000	.00668	.00023	....	....	
1, 850	185, 000	.00688	.00020	....	....	Elastic limit.
1, 900	190, 000	.00717	.00029	....	....	
1, 950	195, 000	.00778	.00061	....	....	
2, 000	200, 000	.01185	.00407	....	....	
2, 050	205, 000	.018	.00615	....	....	
2, 100	210, 000	.028	.010	....	....	
2, 122	212, 200	.037	.009	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	212, 200
Elastic limit per square inch of original section	do...	185, 000
Elongation per inch after rupture	inch..	0. 028
Elongation per inch under strain at elastic limit	do...	.00688
Reduction in area after rupture, per centum of original section		36. 0
Position of rupture		1″.8 inside the gauged section
Character of broken surface		fine silky

No. 2813.

COIL No. 34. WEIGHT, 62¾ POUNDS.

Inside end of coil.
Sectional area, ″.1002 × ″.0990 =.0099 square inch.
Outside end measures ″.1007 × ″.1026.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00177	.00177	....	....	
990	100, 000	.00365	.00188	....	....	
1, 485	150, 000	.00550	.00185	....	....	
1, 534	155, 000	.00568	.00018	....	....	
1, 584	160, 000	.00582	.00014	....	....	
1, 633	165, 000	.00598	.00016	....	....	
1, 683	170, 000	.00618	.00020	....	....	
1, 732	175, 000	.00642	.00024	....	....	
1, 782	180, 000	.00660	.00018	....	....	
1, 831	185, 000	.00678	.00018	....	....	
1, 881	190, 000	.00700	.00022	....	....	
1, 930	195, 000	.00720	.00020	....	....	
1, 980	200, 000	.00743	.00023	....	....	Elastic limit.
2, 029	205, 000	.00775	.00032	....	....	
2, 079	210, 000	.00840	.00065	....	....	
2, 128	215, 000	.01380	.00540	....	....	
2, 178	220, 000	.023	.00920	....	....	
2, 221	224, 340	.032	.009	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds..	224, 340
Elastic limit per square inch of original section..........do..	200, 000
Elongation per inch after rupture..........inch..	0. 016
Elongation per inch under strain at elastic limit..........do...	.00743
Reduction in area after rupture, per centum of original section..........	5. 1
Position of rupture..........	6″.2 outside the gauged section
Character of broken surface..........	fine silky

No. 2814.

COIL NO. 35. WEIGHT, 41¼ POUNDS.

Outside end of coil.
Sectional area, ″.1000 × ″.0996 = .0099 inch.
Inside end measures ″.0994 × ″.0990.
Gauged length, 10″.
Two corners rounded; two corners square.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00185	.00185	....	....	
990	100,000	.00378	.00193	....	....	
1,485	150,000	.00576	.00198	....	....	
1,534	155,000	.00600	.00024	....	....	
1,584	160,000	.00622	.00022	....	....	Elastic limit.
1,633	165,000	.00662	.00040	....	....	
1,683	170,000	.00695	.00033	....	....	
1,732	175,000	.00930	.00235	....	....	
1,775	179,290	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	179,290
Elastic limit per square inch of original section	do	160,000
Elongation per inch under strain at elastic limit	inch	.00622
Reduction in area after rupture, per centum of original section		40.4
Position of rupture		outside the gauged length
Character of broken surface		fine silky

No. 2815.

Coil No. 36. Weight, 27½ Pounds.

Inside end of coil.
Sectional area, ″.0986 × ″.0996 = .0098 square inch.
Outside end measures ″.0994 × ″.0986.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
490	50,000	.00180	.00180	....	....	
980	100,000	.00376	.00196	....	....	
1,470	150,000	.00572	.00196	....	....	
1,519	155,000	.00591	.00019	....	....	
1,568	160,000	.00617	.00026	....	....	
1,617	165,000	.00640	.00023	....	....	
1,666	170,000	.00661	.00021	....	....	
1,715	175,000	.00687	.00026	....	....	Elastic limit.
1,764	180,000	.00717	.00030	....	....	
1,813	185,000	.00800	.00083	....	....	
1,862	190,000	.00950	.00150	....	....	
1,911	195,000	.014	.00450	....	....	
1,960	200,000	.019	.005	....	....	
2,000	204,080	.026	.007	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	204,080
Elastic limit per square inch of original section	do...	175,000
Elongation per inch after rupture	inch..	0.012
Elongation per inch under strain at elastic limit	do...	.00687
Reduction in area after rupture, per centum of original section		42.9
Position of rupture		13″ outside the gauged section
Character of broken surface		fine silky

No. 2816.

COIL NO. 37. WEIGHT, 34¾ POUNDS.

Outside end of coil.
Sectional area, ″.0998 × ″.0997 = ″.0099 square inch.
Inside end measures ″.1006 × ″.1012.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00178	.00178			
990	100, 000	.00360	.00182			
1, 485	150, 000	.00540	.00180			
1, 534	155, 000	.00557	.00017			
1, 584	160, 000	.00575	.00018			
1, 633	165, 000	.00592	.00017			
1, 683	170, 000	.00610	.00018			
1, 732	175, 000	.00630	.00020			
1, 782	180, 000	.00650	.00020			
1, 831	185, 000	.00669	.00019			
1, 881	190, 000	.00690	.00021			
1, 930	195, 000	.00710	.00020			Elastic limit.
1, 980	200, 000	.00750	.00040			
2, 029	205, 000	.00800	.00050			
2, 079	210, 000	.00920	.00120			
2, 128	215, 000	.017	.00780			
2, 178	220, 000	.023	.006			
2, 198	222, 020	.028	.005			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	222, 020
Elastic limit per square inch of original section	do	195, 000
Elongation per inch after rupture	inch	0. 013
Elongation per inch under strain at elastic limit	do	.00710
Reduction in area after rupture, per centum, of original section		38. 4
Position of rupture		6″.6 outside the gauged section
Character of broken surface		fine silky

No. 2817.

COIL NO. 38. WEIGHT, 60¾ POUNDS.

Inside end of coil.
Sectional area, ″.1008 × ″.1007 = .0101 square inch.
Outside end measures ″.1003 × ″.0994.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
505	50, 000	.00180	.00180	....	....	
1, 010	100, 000	.00372	.00192	....	....	
1, 515	150, 000	.00560	.00188	....	....	
1, 566	155, 000	.00581	.00021	....	....	
1, 616	160, 000	.00601	.00020	....	....	
1, 667	165, 000	.00626	.00025	....	....	
1, 717	170, 000	.00645	.00019	....	....	
1, 768	175, 000	.00667	.00022	....	....	
1, 818	180, 000	.00688	.00021	....	....	Elastic limit.
1, 869	185, 000	.00720	.00032	....	....	
1, 919	190, 000	.00787	.00067	....	....	
1, 970	195, 000	.01040	.00253	....	....	
2, 020	200, 000	.013	.00260	....	....	
2, 071	205, 000	.022	.009	....	....	
2, 096	207, 520	.031	.009	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	207, 520
Elastic limit per square inch of original section	do	180, 000
Elongation per inch after rupture	inch	0. 020
Elongation per inch under strain at elastic limit	do	.00688
Reduction in area after rupture, per centum of original section		36. 6
Position of rupture		″.40 outside the gauged section
Character of broken surface		fine silky

No. 2818.

COIL NO. 39. WEIGHT, 41¾ POUNDS.

Outside end of coil.
Sectional area, ″.0986 × ″.0996 = .0098 square inch.
Inside end measures ″.1017 × ″.1033.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	**Initial load.**
490	50, 000	.00170	.00170	....	....	
980	100, 000	.00358	.00188	....	....	
1, 470	150, 000	.00538	.00180	....	....	
1, 519	155, 000	.00554	.00016	....	....	
1, 568	160, 000	.00580	.00026	....	....	
1, 617	165, 000	.00605	.00025	....	....	
1, 666	170, 000	.00622	.00017	....	....	
1, 715	175, 000	.00638	.00016	....	....	
1, 764	180, 000	.00654	.00016	....	....	
1, 813	185, 000	.00678	.00024	....	....	**Elastic limit.**
1, 862	190, 000	.00712	.00034	....	....	
1, 911	195, 000	.00888	.00176	....	....	
1, 960	200, 000	.017	.00812	....	....	
2, 009	205, 000	.030	.013	....	....	
2, 032	207, 350	.035	.005	....	....	**Tensile strength.**

General summary.

Tensile strength per square inch of original section	pounds..	207, 350
Elastic limit per square inch of original section	do...	185, 000
Elongation per inch after rupture	inch..	0. 020
Elongation per inch under strain at elastic limit	do...	.00678
Reduction in area after rupture, per centum of original section		45. 9
Position of rupture		5″.6 outside the gauged section
Character of broken surface		fine silky

No. 2819.

COIL No. 40. WEIGHT, 28¾ POUNDS.

Inside end of coil.
Sectional area, ″.1000 × ″.0998 = .0099 square inch.
Outside end measures ″.1011 × ″.1020.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00183	.00183	....	....	
990	100,000	.00367	.00184	....	....	
1,485	150,000	.00550	.00183	....	....	
1,534	155,000	.00568	.00018	....	....	
1,584	160,000	.00584	.00016	....	....	
1,633	165,000	.00607	.00023	....	....	
1,683	170,000	.00622	.00015	....	....	
1,732	175,000	.00647	.00025	....	....	
1,782	180,000	.00663	.00016	....	....	
1,831	185,000	.00684	.00021	....	....	Elastic limit.
1,881	190,000	.00717	.00033	....	....	
1,930	195,000	.00770	.00053	....	....	
1,980	200,000	.01140	.00370	....	....	
2,029	205,000	.020	.00860	....	....	
2,079	210,000	.025	.005	....	....	
2,100	212,120	.043	.018	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	212,120
Elastic limit per square inch of original section	do	185,000
Elongation per inch after rupture	inch	0.034
Elongation per inch under strain at elastic limit	do	.00684
Reduction in area after rupture, per centum of original section		46.5
Position of rupture		1″ inside the gauged section
Character of broken surface		fine silky

No. 2820.

Coil No. 41. Weight, 27¼ Pounds.

Outside end of coil.
Sectional area, ″.0995 × ″.0995 = .0099 square inch.
Inside end measures ″.0996 × ″.0998.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00186	.00186	....	....	
990	100, 000	.00368	.00182	....	....	
1, 485	150, 000	.00548	.00180	....	....	
1, 534	155, 000	.00564	.00016	....	....	
1, 584	160, 000	.00585	.00021	....	....	
1, 633	165, 000	.00607	.00022	....	....	
1, 683	170, 000	.00625	.00018	....	....	
1, 732	175, 000	.00643	.00018	....	....	
1, 782	180, 000	.00667	.00024	....	....	
1, 831	185, 000	.00688	.00021	....	....	
1, 881	190, 000	.00707	.00019	....	....	
1, 930	195, 000	.00732	.00025	....	....	Elastic limit.
1, 980	200, 000	.00770	.00038	....	....	
2, 029	205, 000	.00905	.00135	....	....	
2, 079	210, 000	.01390	.00485	....	....	
2, 128	215, 000	.018	.00410	....	....	
2, 176	219, 800	.033	.015	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	219, 800
Elastic limit per square inch of original section	do ...	195, 000
Elongation per inch after rupture	inch..	0. 227
Elongation per inch under strain at elastic limit	do...	.00732
Reduction in area after rupture, per centum of original section		43. 4
Position of rupture		1″.5 inside the gauged length
Character of broken surface		fine, silky

No. 282.

COIL No. 42. WEIGHT, 37¾ POUNDS.

Specimen taken 100 feet from inside end of coil.
Sectional area, ″.1001 × ″.0994 = .0099 square inch.
Outside end measures ″.1001 × ″.1018.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00180	.00180	....	....	
990	100, 000	.00363	.00183	....	....	
1, 485	150, 000	.00551	.00188	....	....	
1, 534	155, 000	.00570	.00019	....	....	
1, 584	160, 000	.00585	.00015	....	....	
1, 633	165, 000	.00602	.00017	....	....	
1, 683	170, 000	.00627	.00025	....	....	
1, 732	175, 000	.00648	.00021	....	....	
1, 782	180, 000	.00667	.00019	....	....	
1, 831	185, 000	.00686	.00019	....	....	
1, 881	190, 000	.00706	.00020	....	....	Elastic limit.
1, 930	195, 000	.00738	.00032	....	....	
1, 980	200, 000	.00760	.00022	....	....	
2, 029	205, 000	.00795	.00035	....	....	
2, 079	210, 000	.01185	.00390	....	....	
2, 128	215, 000	.016	.00415	....	....	
2, 178	220, 000	.028	.012	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	220, 000
Elastic limit per square inch of original section	do...	190, 000
Elongation per inch after rupture	inch..	0. 023
Elongation per inch under strain at elastic limit	do...	.00706
Reduction in area after rupture, per centum of original section		38. 4
Position of rupture		″.85 inside the gauged section
Character of broken surface		fine silky

No. 2822.

COIL NO. 43. WEIGHT, 39½ POUNDS.

Inside end of coil.
Sectional area, ″.1000 × ″.1000 = .010 square inch.
Outside end measures ″.1026 × ″.1025.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.*	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00177	.00177			
1,000	100,000	.00359	.00182			
1,500	150,000	.00538	.00179			
1,550	155,000	.00554	.00016			
1,600	160,000	.00578	.00024			
1,650	165,000	.00598	.00020			
1,700	170,000	.00617	.00019			
1,750	175,000	.00635	.00018			
1,800	180,000	.00652	.00017			
1,850	185,000	.00672	.00020			
1,900	190,000	.00692	.00020			
1,950	195,000	.00717	.00025			Elastic limit.
2,000	200,000	.00747	.00030			
2,050	205,000	.00890	.00143			
2,100	210,000	.01550	.00660			
2,150	215,000	.026	.01050			
2,176	217,600	.032	.006			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	217,600
Elastic limit per square inch of original section	do	195,000
Elongation per inch after rupture	inch	0.014
Elongation per inch under strain at elastic limit	do	.00717
Reduction in area after rupture, per centum of original section		47.0
Position of rupture		10″.5 outside the gauged length
Character of broken surface		fine silky

No. 2823.

COIL NO. 44. WEIGHT, 47¼ POUNDS.

Outside end of coil.
Sectional area, ″.1004 × ″.0996 = .010 square inch.
Inside end measures ″.0994 × ″.0994.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00184	.00084	....	....	
1,000	100,000	.00364	.00180	....	....	
1,500	150,000	.00547	.00183	....	....	
1,550	155,000	.00568	.00021	....	....	
1,600	160,000	.00585	.00017	....	....	
1,650	165,000	.00600	.00015	....	....	
1,700	170,000	.00618	.00018	....	....	
1,750	175,000	.00641	.00023	....	....	
1,800	180,000	.00660	.00019	....	....	
1,850	185,000	.00680	.00020	....	....	
1,900	190,000	.00698	.00018	....	....	
1,950	195,000	.00721	.00023	....	....	
2,000	200,000	.00740	.00019	....	....	Elastic limit.
2,050	205,000	.00800	.00060	....	....	
2,100	210,000	.015	.007	....	....	
2,150	215,000	.025	.010	....	....	
2,186	218,600	.035	.010	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	218,600
Elastic limit per square inch of original section	do...	200,000
Elongation per inch after rupture	inch..	0.020
Elongation per inch under strain at elastic limit	do....	.00740
Reduction in area after rupture, per centum of original section		38.0
Position of rupture		5″.15 outside the gauged section
Character of broken surface		fine silky

No. 2824.

COIL NO. 45. WEIGHT, 71¾ POUNDS.

Inside end of coil.
Sectional area, ″.1004 × ″.1005 = .0101 square inch.
Outside end measures ″.1011 × ″.1003.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
505	50, 000	.00188	.00188	....	....	
1, 010	100, 000	.00378	.00190	....	....	
1, 515	150, 000	.00558	.00180	....	....	
1, 566	155, 000	.00578	.00020	....	....	
1, 616	160, 000	.00596	.00018	....	....	
1, 667	165, 000	.00614	.00018	....	....	
1, 717	170, 000	.00637	.00023	....	....	
1, 768	175, 000	.00658	.00021	....	....	
1, 818	180, 000	.00678	.00020	....	....	
1, 869	185, 000	.00702	.00024	....	....	Elastic limit.
1, 919	190, 000	.00735	.00033	....	....	
1, 970	195, 000	.00805	.00070	....	....	
2, 020	200, 000	.00968	.00163	....	....	
2, 071	205, 000	.013	.00332	....	....	
2, 171	210, 000	.017	.004	....	....	
2, 222	215, 000	.027	.010	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	215, 000
Elastic limit per square inch of original section	do	185, 000
Elongation per inch after rupture	inch	0. 017
Elongation per inch under strain at elastic limit	do	. 00702
Reduction in area after rupture, per centum of original section		36. 6
Position of rupture		4″ outside the gauged section
Character of broken surface		fine silky

No. 2825.

COIL No. 46. WEIGHT, 29 POUNDS.

Outside end of coil.
Sectional area, ″.0994 × ″.0996 = .0099 square inch.
Inside end measures ″.1016 × ″.1017.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00171	.00171	....	....	
990	100,000	.00360	.00189	....	....	
1,485	150,000	.00551	.00191	....	....	
1,535	155,000	.00568	.00017	....	....	
1,584	160,000	.00584	.00016	....	....	
1,634	165,000	.00604	.00020	....	....	
1,683	170,000	.00626	.00022	....	....	
1,733	175,000	.00651	.00025	....	....	Elastic limit.
1,782	180,000	.00690	.00039	....	....	
1,831	185,000	.00784	.00094	....	....	
1,881	190,000	.014	.00616	....	....	
1,931	195,000	.021	.007	....	....	
1,967	198,680	.026	.005	....	....	Tensile strength

General summary.

Tensile strength per square inch of original section	pounds	198,680
Elastic limit per square inch of original section	do.	175,000
Elongation per inch after rupture	inch	0.016
Elongation per inch under strain at elastic limit	do.	.00651
Reduction in area after rupture, per centum of original section		35.4
Position of rupture		½″ outside the gauged section
Character of broken surface		fine silky

No. 2826.

COIL NO. 47. WEIGHT, 73¾ POUNDS.

Specimen taken from near the middle of the coil; the two parts of the coil weighing 36½ and 37¼ pounds, respectively.

Sectional area, ″.1001 × ″.0994 = .0099 square inch.

Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00184	.00184	....	....	
990	100, 000	.00368	.00184	....	....	
1, 485	150, 000	.00547	.00179	....	....	
1, 535	155, 000	.00566	.00019	....	....	
1, 584	160, 000	.00587	.00021	....	....	
1, 634	165, 000	.00607	.00020	....	....	
1, 683	170, 000	.00628	.00021	....	....	
1, 733	175, 000	.00648	.00020	....	....	
1, 782	180, 000	.00673	.00025	....	....	Elastic limit.
1, 832	185, 000	.00720	.00047	....	....	
1, 881	190, 000	.012	.00480	....	....	
1, 931	195, 000	.017	.005	....	....	
1, 980	200, 000	.035	.018	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	200, 000
Elastic limit per square inch of original section	do...	180, 000
Elongation per inch after rupture	inch..	0. 030
Elongation per inch under strain at elastic limit	do...	.00673
Reduction in area after rupture, per centum of original section		41. 4
Position of rupture		1″.75 inside the gauged section
Character of broken surface		fine silky

No. 2827.

COIL NO. 48. WEIGHT, 25 POUNDS.

Inside end of coil.
Sectional area, ″.1024 × ″.0996 = .0102 square inch.
Outside end measures ″.0992 × ″.1002.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
510	50, 000	.00181	.00181	....	....	
1, 020	100, 000	.00372	.00192	....	....	
1, 530	150, 000	.00565	.00193	....	....	
1, 581	155, 000	.00580	.00015	....	....	Elastic limit.
1, 632	160, 000	.00610	.00030	....	....	
1, 683	165, 000	.00640	.00030	....	....	
1, 734	170, 000	.00688	.00048	....	....	
1, 785	175, 000	.00775	.00087	....	....	
1, 836	180, 000	.00995	.00220	....	....	
1, 872	183, 530	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	183, 530
Elastic limit per square inch of original section	do...	155, 000
Elongation per inch under strain at elastic limit	inch..	.00580
Reduction in area after rupture, per centum of original section		35. 3
Character of broken surface		fine silky

No. 2828.

COIL NO. 49. WEIGHT, 73¾ POUNDS.

Outside end of coil.
Sectional area, ″.1006 × ″.1012 = .0101 square inch.
Inside end measures ″.1000 × ″.1000.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
505	50, 000	.00180	.00180			
1, 010	100, 000	.00368	.00188			
1, 515	150, 000	.00560	.00192			
1, 566	155, 000	.00575	.00015			
1, 616	160, 000	.00590	.00015			
1, 667	165, 000	.00610	.00020			
1, 717	170, 000	.00628	.00018			
1, 768	175, 000	.00648	.00020			
1, 818	180, 000	.00668	.00020			
1, 869	185, 000	.00688	.00020			
1, 919	190, 000	.00710	.00022			Elastic limit.
1, 970	195, 000	.00738	.00028			
2, 020	200, 000	.00772	.00034			
2, 071	205, 000	.00825	.00053			
2, 121	210, 000	.013	.00475			
2, 171	215, 000	.017	.004			
2, 222	220, 000	.035	.018			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	220, 000
Elastic limit per square inch of original section	do	190, 000
Elongation per inch after rupture	inch	0. 028
Elongation per inch under strain at elastic limit	do	.00710
Reduction in area after rupture, per centum of original section		44. 6
Position of rupture		″.85 inside the gauged length
Character of broken surface		fine silky

No. 2829.

COIL NO. 50. WEIGHT, 24¾ POUNDS.

Inside end of coil.
Sectional area, ″.1004 × ″.1006 =.0101 square inch.
Outside end measures ″.0994″ × .0996.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
505	50, 000	.00160	.00160	....	....	
1, 010	100, 000	.00367	.00207	....	....	
1, 515	150, 000	.00552	.00188	....	....	
1, 565	155, 000	.00567	.00015	....	....	
1, 616	160, 000	.00588	.00021	....	....	
1, 666	165, 000	.00608	.00020	....	....	
1, 717	170, 000	.00628	.00020	....	....	
1, 767	175, 000	.00650	.00022	....	....	Elastic limit.
1, 818	180, 000	.00678	.00028	....	....	
1, 868	185, 000	.00950	.00272	....	....	
1, 919	190, 000	.016	.00650	....	....	
1, 969	195, 000	.028	.012	....	....	
1, 989	196, 930	.036	.008	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	196, 930
Elastic limit per square inch of original section	do...	175, 000
Elongation per inch after rupture	inch..	0. 023
Elongation per inch under strain at elastic limit	do...	.00650
Reduction in area after rupture, per centum of original section		44. 6
Position of rupture		6″.6 outside the gauged length
Character of broken surface		fine silky

No. 2830.

COIL NO. 51. WEIGHT, 27½ POUNDS.

Outside end of coil.
Sectional area, ″.1000 × ″.1000 =.010 square inch.
Inside end measures ″.1002 × ″.1004.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
500	50, 000	.00187	.00187			
1, 000	100, 000	.00365	.00178			
1, 500	150, 000	.00533	.00168			
1, 550	155, 000	.00550	.00017			
1.600	160, 000	.00575	.00025			
1, 650	165, 000	.00590	.00015			
1, 700	170, 000	.00607	.00017			
1, 750	175, 000	.00625	.00018			
1, 800	180, 000	.00645	.00020			
1, 850	185, 000	.00665	.00020			
1, 900	190, 000	.00690	.00025			
1, 950	195, 000	.00717	.00027			Elastic limit.
2, 000	200, 000	.00747	.00030			
2, 050	205, 000	.01150	.00403			
2, 100	210, 000	.014	.00250			
2, 150	215, 000	.021	.007			
2. 175	217, 500	.028	.007			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	217, 500
Elastic limit per square inch of original section	do ...	195, 000
Elongation per inch after rupture	inch..	0. 013
Elongation per inch under strain at elastic limit	do...	.00717
Reduction in area after rupture, per centum of original section		44. 0
Position of rupture		13″ outside the gauged length
Character of broken surface		fine silky

No. 2831.

COIL No. 52. WEIGHT, 41¼ POUNDS.

Inside end of coil.
Sectional area, ″.0994 × ″.0993 =.0099 square inch.
Outside end measures ″.1006 × ″.1003.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00186	.00186	....	....	
990	100, 000	.00377	.00191	....	....	
1, 485	150, 000	.00567	.00190	....	....	
1, 535	155, 000	.00590	.00023	....	....	
1, 584	160, 000	.00613	.00023	....	....	
1, 634	165, 000	.00641	.00028	....	....	Elastic limit.
1, 683	170, 000	.00670	.00029	....	....	
1, 733	175, 000	.00738	.00068	....	....	
1, 782	180, 000	.00870	.00132	....	....	
1, 832	185, 000	.01175	.00305	....	....	
1, 881	190, 000	.020	.00825	....	....	
1, 890	190, 910	.022	.002	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	190, 910
Elastic limit per square inch of original section	do	165, 000
Elongation per inch after rupture	inch	0. 015
Elongation per inch under strain at elastic limit	do	.00641
Reduction in area after rupture, per centum of original section		41. 4
Position of rupture		4″.4 inside the gauged section
Character of broken surface		fine silky

No. 2832.

COIL No. 53. WEIGHT, 17½ POUNDS.

Outside end of coil.
Sectional area, ″.1004 × ″.0996=.010 square inch.
Inside end measures ″.1012 × ″.1008.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
500	50, 000	.00178	.00178	....	....	
1, 000	100, 000	.00370	.00192	....	....	
1, 500	150, 000	.00558	.00188	....	....	
1, 550	155, 000	.00572	.00014	....	....	
1, 600	160, 000	.00595	.00023	....	....	
1, 650	165, 000	.00618	.00023	....	....	Elastic limit.
1, 700	170, 000	.00648	.00030	....	....	
1, 750	175, 000	.00707	.00059	....	....	
1, 800	180, 000	.00810	.00103	....	....	
1, 850	185, 000	.012	.00390	....	....	
1, 900	190, 000	.016	.004	....	....	
1, 942	194, 200	.023	.007	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	194, 200
Elastic limit per square inch of original section	do...	165, 000
Elongation per inch after rupture	inch..	0. 019
Elongation per inch under strain at elastic limit	do...	.00618
Reduction in area after rupture, per centum of original section		41. 0
Position of rupture		1″. 25 inside the gauged length
Character of broken surface		fine silky

No. 2833.

COIL NO. 54. WEIGHT, 35¾ POUNDS.

Outside end of coil.
Sectional area, ″.0997 × ″.0998 = .0099 square inch.
Inside end measures same as outside.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00180	.00180	....	....	
990	100, 000	.00368	.00188	....	....	
1, 485	150, 000	.00560	.00192	....	....	
1, 535	155, 000	.00577	.00017	....	....	
1, 584	160, 000	.00597	.00020	....	....	
1, 634	165, 000	.00620	.00023	....	....	
1, 683	170, 000	.00638	.00018	....	....	
1, 733	175, 000	.00668	.00030	....	....	
1, 782	180, 000	.00688	.00020	....	....	Elastic limit.
1, 832	185, 000	.00727	.00039	....	....	
1, 881	190, 000	.00787	.00060	....	....	
1, 931	195, 000	.01150	.00363	....	....	
1, 980	200, 000	.016	.00450	....	....	
2, 000	202, 020	.021	.005	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	202, 020
Elastic limit per square inch of original section	do...	180, 000
Elongation per inch after rupture	inch..	0. 008
Elongation per inch under strain at elastic limit	do...	.00688
Reduction in area after rupture, per centum of original section		35. 3
Position of rupture		9″.55 outside the gauged section
Character of broken surface		fine silky

No. 2834.

COIL NO. 55. WEIGHT, 35½ POUNDS.

Inside end of coil.
Sectional area, ″.1003 × ″.1004 =.010 square inch.
Outside end measures ″.1032 × ″.1041.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch	Permanent set.	Successive permanent set	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
500	50, 000	.00185	.00185	....	....	
1, 000	100, 000	.00368	.00183	....	....	
1, 500	150, 000	.00548	.00180	....	....	
1, 550	155, 000	.00568	.00020	....	....	
1, 600	160, 000	.00588	.00020	....	....	
1, 650	165, 000	.00608	.00020	....	....	
1, 700	170, 000	.00628	.00020	....	....	
1, 750	175, 000	.00648	.00020	....	....	
1, 800	180, 000	.00668	.00020	....	....	
1, 850	185, 000	.00688	.00020	....	....	
1, 900	190, 000	.00715	.00027	....	....	Elastic limit.
1, 950	195, 000	.00750	.00035	....	....	
2, 000	200, 000	.00878	.00128	....	....	
2, 050	205, 000	.01350	.00472	....	....	
2, 100	210, 000	.019	.00550	....	....	
2, 145	214, 500	.034	.015	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	214, 500
Elastic limit per square inch of original section	do	190, 000
Elongation per inch after rupture	inch	0. 020
Elongation per inch under strain at elastic limit	do	.00715
Reduction in area after rupture, per centum of original section		44. 0
Position of rupture		3″.8 outside the gauged section
Character of broken surface		fine silky

No. 2835.

COIL NO. 56. WEIGHT, 26¾ POUNDS.

Outside end of coil.
Sectional area, ″.0992 × ″.0998 = .0099 square inch.
Inside end measures ″.0994 × ″.0997.
Gauged length, 10″.
Surface of wire scored by deep scratches.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00180	.00180	....	....	
990	100,000	.00370	.00190	....	....	
1,485	150,000	.00580	.00220	....	....	
1,534	155,000	.00607	.00027	....	....	Elastic limit.
1,584	160,000	.00637	.00030	....	....	
1,533	165,000	.00670	.00033	....	....	
1,683	170,000	.00738	.00068	....	....	
1,732	175,000	.00920	.00182	....	....	
1,770	178,790	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....................................pounds..	178,790
Elastic limit per square inch of original section ....do...	155,000
Elongation per inch under strain at elastic limit..inch..	.00607
Reduction in area after rupture, per centum of original section..................................	33.3
Character of broken surface...	fine silky

No. 2836.

COIL NO. 57. WEIGHT, 36 POUNDS.

Inside end of coil.
Sectional area, ″.1002 × ″.1002 =.010 square inch.
Outside end measures ″.1001 × ″.0998.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
500	50, 000	.00180	.00180	....	....	
1, 000	100, 000	.00364	.00184	....	....	
1, 500	150, 000	.00548	.00184	....	....	
1, 550	155, 000	.00559	.00011	....	....	
1, 600	160, 000	.00578	.00019	....	....	
1, 650	165, 000	.00598	.00020	....	....	
1, 700	170, 000	.00615	.00017	....	....	
1, 750	175, 000	.00633	.00018	....	....	Elastic limit.
1, 800	180, 000	.00657	.00024	....	....	
1, 850	185, 000	.00688	.00031	....	....	
1, 900	190, 000	.00910	.00222	....	....	
1, 950	195, 000	.01500	.00590	....	....	
2, 000	200, 000	.021	.006	....	....	
2, 014	201, 400	.027	.006	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	201, 400
Elastic limit per square inch of original section .... do...	175, 000
Elongation per inch after rupture .... inch..	0. 015
Elongation per inch under strain at elastic limit .... do...	.00633
Reduction in area after rupture, per centum of original section	44. 0
Position of rupture	3″.2 outside the gauged section
Character of broken surface	fine silky

No. 2837.

Coil No. 58. Weight, 33½ Pounds.

Outside end of coil.
Sectional area, ″.1033 × ″.1013 = .0104 square inch.
Inside end measures ″.1002 × ″.1000.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
52	1,000	0.	0.	0.	0.	Initial load.
520	50,000	.00187	.00187	....	....	
1,040	100,000	.00383	.00196	....	....	
1,560	150,000	.00560	.00177	....	....	
1,612	155,000	.00580	.00020	....	....	
1,664	160,000	.00597	.00017	....	....	
1,716	165,000	.00614	.00017	....	....	
1,768	170,000	.00640	.00026	....	....	
1,820	175,000	.00660	.00020	....	....	
1,872	180,000	.00686	.00026	....	....	
1,924	185,000	.00712	.00026	....	....	Elastic limit.
1,976	190,000	.00807	.00095	....	....	
2,028	195,000	.01350	.00543	....	....	
2,080	200,000	.019	.00550	....	....	
2,132	205,000	.031	.012	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	205,000
Elastic limit per square inch of original section .... do...	185,000
Elongation per inch after rupture .... inch..	0.019
Elongation per inch under strain at elastic limit .... do...	.00712
Reduction in area after rupture, per centum of original section	35.6
Position of rupture	4″ outside the gauged section
Character of broken surface	fine silky

No. 2838.

COIL NO. 59. WEIGHT, 35¾ POUNDS.

Inside end of coil.
Sectional area, ″.1002 × ″.1006 =.010 square inch.
Outside end measures ″.0998 × ″.1002.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
500	50, 000	.00172	.00172	....	....	
1, 000	100, 000	.00368	.00196	....	....	
1, 500	150, 000	.00555	.00187	....	....	
1, 550	155, 000	.00575	.00020	....	....	
1, 600	160, 000	.00590	.00015	....	....	
1, 650	165, 000	.00607	.00017	....	....	
1, 700	170, 000	.00630	.00023	....	....	
1, 750	175, 000	.00657	.00027	....	....	
1, 800	180, 000	.00680	.00023	....	....	Elastic limit.
1, 850	185, 000	.00712	.00032	....	....	
1, 900	190, 000	.00785	.90073	....	....	
1, 950	195, 000	.01080	.00295	....	....	
2, 000	200, 000	.013	.00220	....	....	
2, 050	205, 000	.017	.004	....	....	
2, 081	208, 100	.021	.004	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	208, 100
Elastic limit per square inch of original section ....do...	180, 100
Elongation per inch after rupture ....inch..	0.007
Elongation per inch under strain at elastic limit..do ..	.00680
Reduction in area after rupture, per centum of original section..............................	39.0
Position of rupture	12″.7 outside the gauged section
Character of broken surface..	fine silky

No. 2839.

COIL NO. 60. WEIGHT, 32¾ POUNDS.

Outside end of coil.
Sectional area, ″.1004 × ″.1024 = .0102 square inch.
Inside end measures ″.0996 × ″.1000.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
510	50,000	.00176	.00176	....	....	
1,020	100,000	.00367	.00191	....	....	
1,530	150,000	.00549	.00182	....	....	
1,581	155,000	.00564	.00015	....	....	
1,632	160,000	.00587	.00023	....	....	
1,683	165,000	.00600	.00013	....	....	
1,734	170,000	.00620	.00020	....	....	
1,785	175,000	.00635	.00015	....	....	
1,836	180,000	.00658	.00023	....	....	
1,887	185,000	.00679	.00021	....	....	
1,938	190,000	.00706	.00027	....	....	Elastic limit.
1,989	195,000	.00741	.00035	....	....	
2,040	200,000	.00850	.00109	....	....	
2,092	205,000	.01350	.00500	....	....	
2,143	210,000	.017	.00350	....	....	
2,194	215,000	.035	.018	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	215,000
Elastic limit per square inch of original section	do	190,000
Elongation per inch after rupture	inch	0.030
Elongation per inch under strain at elastic limit	do	.00706
Reduction in area after rupture, per centum of original section		46.1
Position of rupture		2″.25 inside the gauged section
Character of broken surface		fine silky

No. 2840.

COIL NO. 61. WEIGHT, 41 POUNDS.

Specimen taken 100 feet from outside end of coil.
Sectional area, ″.1016 × ″.1009 = .0102 square inch.
Inside end measures ″.0990 × ″.0993.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
510	50,000	.00187	.00187	....	....	
1,020	100,000	.00374	.00187	....	....	
1,530	150,000	.00562	.00188	....	....	
1,581	155,000	.00578	.00016	....	....	
1,632	160,000	.00601	.00023	....	....	
1,683	165,000	.00619	.00018	....	....	
1,734	170,000	.00642	.00023	....	....	Elastic limit.
1,785	175,000	.00678	.00036	....	....	
1,836	180,000	.00712	.00034	....	....	
1,887	185,000	.00827	.00115	....	....	
1,938	190,000	.01515	.00688	....	....	
1,989	195,000	.017	.00185	....	....	
2,040	200,000	.032	.015	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	200,000
Elastic limit per square inch of original section	do...	170,000
Elongation per inch after rupture	inch..	0.013
Elongation per inch under strain at elastic limit	do...	.00649
Reduction in area after rupture, per centum of original section		34.2
Position of rupture		8″.6 outside the gauged section
Character of broken surface		fine silky

No. 2841.

COIL NO. 62. WEIGHT, 27 POUNDS.

Outside end of coil.
Sectional area, ″.0998 × ″.1006 = .010 square inch.
Inside end measures ″.0993 × ″.0993.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00188	.00188	....	....	
1,000	100,000	.00375	.00187	....	....	
1,500	150,000	.00558	.00183	....	....	
1,550	155,000	.00578	.00020	....	....	
1,600	160,000	.00598	.00020	....	....	
1,650	165,000	.00618	.00020	....	....	Elastic limit.
1,700	170,000	.00650	.00032	....	....	
1,750	175,000	.00678	.00028	....	....	
1,800	180,000	.00760	.00082	....	....	
1,850	185,000	.01450	.00690	....	....	
1,892	189,200	.020	.00550	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	189,200
Elastic limit per square inch of original section	do...	165,000
Elongation per inch after rupture	inch..	0.005
Elongation per inch under strain at elastic limit	do...	.00618
Reduction in area after rupture, per centum of original section		31.0
Position of rupture		6″.7 outside the gauged section
Character of broken surface		fine silky

No. 2842.

COIL NO. 13. WEIGHT, 37 POUNDS.

Inside end of coil.
Sectional area, ″.1023 × ″.1006=.0103 square inch.
Outside end measures ″.0991 × ″.0992.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
52	5,000	0.	0.	0.	0.	Initial load.
515	50,000	.00180	.00180	....	....	
1,030	100,000	.00375	.00195	....	....	
1,545	150,000	.00567	.00192	....	....	
1,597	155,000	.00580	.00013	....	....	
1,648	160,000	.00594	.00014	....	....	
1,700	165,000	.00615	.00021	....	....	
1,751	170,000	.00638	.00023	....	....	
1,803	175,000	.00660	.00022	....	....	Elastic limit.
1,854	180,000	.00687	.00027	....	....	
1,906	185,000	.00740	.00053	....	....	
1,957	190,000	.01295	.00555	....	....	
2,009	195,000	.022	.00905	....	....	
2,054	199,420	.034	.012	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	199,420
Elastic limit per square inch of original section	do...	175,000
Elongation per inch after rupture	inch..	0.028
Elongation per inch under strain at elastic limit	do...	.00660
Reduction in area after rupture, per centum of original section		40.8
Position of rupture		2″.5 inside the gauged section
Character of broken surface		fine silky

No. 2843.

COIL NO. 64. WEIGHT, 35¼ POUNDS.

Outside end of coil.
Sectional area, ″.1031 × ″.1018 = .0105 square inch.
Inside end measures ″.1000 × ″.0996.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
52	5,000	0.	0.	0.	0.	Initial load.
525	50,000	.00182	.00182			
1,050	100,000	.00369	.00187			
1,575	150,000	.00560	.00191			
1,627	155,000	.00580	.00020			
1,680	160,000	.00594	.00014			
1,732	165,000	.00614	.00020			
1,785	170,000	.00638	.00024			
1,837	175,000	.00664	.00026			
1,890	180,000	.00688	.00024			
1,942	185,000	.00712	.00024			Elastic limit.
1,995	190,000	.00875	.00163			
2,047	195,000	.01350	.00475			
2,100	200,000	.021	.00750			
2,135	203,330	.031	.010			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	203,330
Elastic limit per square inch of original section	do	185,000
Elongation per inch after rupture	inch	0.028
Elongation per inch under strain at elastic limit	do	.00712
Reduction in area after rupture, per centum of original section		46.7
Position of rupture		2″.35 inside the gauged section
Character of broken surface		fine silky

No. 2844.

COIL NO. 65. WEIGHT, 31 POUNDS.

Inside end of coil.
Sectional area, ″.0996 × ″.0998 =.0099 square inch.
Outside end measures ″.1007 × ″.1004.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00170	.00170	....	....	
990	100,000	.00350	.00180	....	....	
1,485	150,000	.00531	.00181	....	....	
1,535	155,000	.00551	.00020	....	....	
1,584	160,000	.00570	.00019	....	....	
1,634	165,000	.00587	.00017	....	....	
1,683	170,000	.00602	.00015	....	....	
1,733	175,000	.00624	.00022	....	....	
1,782	180,000	.00641	.00017	....	....	
1,832	185,000	.00666	.00025	....	....	
1,881	190,000	.00683	.00017	....	....	
1,931	195,000	.00703	.00020	....	....	
1,980	200,000	.00728	.00025	....	....	Elastic limit.
2,030	205,000	.00755	.00027	....	....	
2,079	210,000	.00795	.00040	....	....	
2,129	215,000	.00950	.00155	....	....	
2,228	225,000	.020	.01050	....	....	
2,277	230,000	.027	.007	....	....	
2,292	231,520	.034	.007	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	231,520
Elastic limit per square inch of original section	do...	200,000
Elongation per inch after rupture	inch..	0.018
Elongation per inch under strain at elastic limit	do...	.00728
Reduction in area after rupture, per centum of original section		35.4
Position of rupture		6″.5 outside the gauged section
Character of broken surface		fine silky

No. 2845.

COIL NO. 66. WEIGHT, 33½ POUNDS.

Outside end of coil.
Sectional area, ″.1009 × ″.1014 =.0102 square inch.
Inside end measures ″.1000 × ″.1002.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
510	50,000	.00178	.00178	....	....	
1,020	100,000	.00362	.00184	....	....	
1,530	150,000	.00547	.00185	....	....	
1,581	155,000	.00568	.00021	....	....	
1,632	160,000	.00582	.00014	....	....	
1,683	165,000	.00599	.00017	....	....	
1,734	170,000	.00618	.00019	....	....	
1,785	175,000	.00638	.00020	....	....	
1,836	180,000	.00660	.00022	....	....	
1,887	185,000	.00678	.00018	....	....	
1,938	190,000	.00700	.00022	....	....	Elastic limit.
1,989	195,000	.00728	.00028	....	....	
2,040	200,000	.00785	.00057	....	....	
2,091	205,000	.01450	.00665	....	....	
2,142	210,000	.017	.00250	....	....	
2,193	215,000	.038	.021	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	215,000
Elastic limit per square inch of original section	do	190,000
Elongation per inch after rupture	inch	0.027
Elongation per inch under strain at elastic limit	do	.00700
Reduction in area after rupture, per centum of original section		40.2
Position of rupture		4″.4 outside the gauged section
Character of broken surface		fine silky

No. 2846.

Coil, No. 67. Weight, 46¼ Pounds.

Specimen taken 100 ft. from outside end of coil.
Sectional area, ″.0996 × ″.0091=.0099 square inch.
Inside end measures ″.0990 × ″.0984.
Gauged length, 10″.
Surface scored with deep scratches.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00178	.00178	....	....	
990	100,000	.00361	.00183	....	....	
1,485	150,000	.00551	.00190	....	....	
1,535	155,000	.00567	.00016	....	....	
1,584	160,000	.00590	.00023	....	....	
1,634	165,000	.00607	.00017	....	....	
1,683	170,000	.00628	.00021	....	....	
1,733	175,000	.00651	.00023	....	....	Elastic limit.
1,782	180,000	.00678	.00027	....	....	
1,832	185,000	.00717	.00039	....	....	
1,881	190,000	.01100	.00383	....	....	
1,931	195,000	.015	.004	....	....	
1,980	200,000	.028	.013	....	....	
1,988	200,810	.031	.003	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section............pounds..	200,810
Elastic limit per square inch of original section............do...	175,000
Elongation per inch after rupture............inch..	0.017
Elongation per inch under strain at elastic limit............do..	.00651
Reduction in area after rupture, per centum of original section............	38.4
Position of rupture............	1″.45 outside the gauge section
Character of broken surface............	fine silky

No. 2847.

COIL NO. 68. WEIGHT, 39 POUNDS.

Inside end of coil.
Sectional area, ″.1000 × ″.1006=.010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00172	.00172	....	....	
1,000	100,000	.00364	.00192	....	....	
1,500	150,000	.00538	.00174	....	....	
1,550	155,000	.00557	.00019	....	....	
1,600	160,000	.00570	.00013	....	....	
1,650	165,000	.00597	.00027	....	....	
1,700	170,000	.00612	.00015	....	....	
1,750	175,000	.00635	.00023	....	....	
1,800	180,000	.00650	.00015	....	....	
1,850	185,000	.00675	.00025	....	....	
1,900	190,000	.00695	.00020	....	....	
1,950	195,000	.00715	.00020	....	....	
2,000	200,000	.00738	.00023	....	....	Elastic limit.
2,050	205,000	.00843	.00105	....	....	
2,100	210,000	.013	.00457	....	....	
2,150	215,000	.018	.005	....	....	
2,200	220,000	.028	.010	....	....	Tensile strength.

General summary

Tensile strength per square inch of original section	pounds	220,000
Elastic limit per square inch of original section	do	200,000
Elongation per inch after rupture	inch	0.015
Elongation per inch under strain at elastic limit	do	.00738
Reduction in area after rupture, per centum of original section		44.0
Position of rupture		7″.3 outside the gauged section
Character of broken surface		fine silky

No. 2848.

COIL NO. 69. WEIGHT, 34¾ POUNDS.

Outside end of coil.
Sectional area, ″.1012 × ″.1005 =.0102 square inches.
Inside end measures ″.1000 × ″.0998.
Gauged length, ″10.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
510	50, 000	.00180	.00180	....	....	
1, 020	100, 000	.00362	.00182	....	....	
1, 530	150, 000	.00550	.00188	....	....	
1, 581	155, 000	.00568	.00018	....	....	
1, 632	160, 000	.00587	.00019	....	....	
1, 683	165, 000	.00595	.00008	....	....	
1, 734	170, 000	.00625	.00030	....	....	
1, 785	175, 000	.00648	.00023	....	....	
1, 836	180, 000	.00668	.00020	....	....	
1, 887	185, 000	.00692	.00024	....	....	Elastic limit.
1, 938	190, 000	.00730	.00038	....	....	
1, 989	195, 000	.01240	.00510	....	....	
2, 040	200, 000	.020	.00760	....	....	
2, 066	202, 550	.026	.006	....	....	Tensile strength.

General Summary.

Tensile strength per square inch of original section..................................pounds..	202, 550
Elastic limit per square inch of original section...do...	185, 000
Elongation per inch after rupture...inch..	0. 015
Elongation per inch under strain at elastic limit..do..	.00692
Reduction in area after rupture, per centum of original section..............................	45. 1
Position of rupture...	3″.3 outside the gauged section
Character of broken surface	fine silky

No. 2849.

Coil No. 70. Weight, 27 Pounds.

Inside end of coil.
Sectional area, ″.0996×″.0997=.0099 square inch.
Outside end measures ″.0991×″.0992.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	....	....	Initial load.
495	50,000	.00174	.00174	....	....	
990	100,000	.00354	.00180	....	....	
1,485	150,000	.00533	.00179	....	....	
1,535	155,000	.00555	.00022	....	....	
1,584	160,000	.00570	.00015	....	....	
1,634	165,000	.00590	.00020	....	....	
1,683	170,000	.00611	.00021	....	....	
1,733	175,000	.00630	.00019	....	....	
1,782	180,000	.00650	.00020	....	....	
1,832	185,000	.00674	.00024	....	....	Elastic limit.
1,881	190,000	.00702	.00028	....	....	
1,931	195,000	.00754	.00052	....	....	
1,980	200,000	.01030	.00276	....	....	
2,030	205,000	.01350	.00320	....	....	
2,079	210,000	.020	.00650	....	....	
2,110	213,130	.026	.006	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	213,130
Elastic limit per square inch of original section	do	180,000
Elongation per inch after rupture	inch	0.011
Elongation per inch under strain at elastic limit	do	.00674
Reduction in area after rupture, per centum of original section		38.4
Position of rupture		9″.65 outside the gauged section
Character of broken surface		fine silky

No. 2850.

COIL NO. 71. WEIGHT, 39¼ POUNDS.

Outside end of coil.
Sectional area, ″.1007 × ″.1002 = .010 square inch.
Inside end measures same as outside.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00178	.00178	....	....	
1,000	100,000	.00368	.00190	....	....	
1,500	150,000	.00547	.00179	....	....	
1,550	155,000	.00565	.00018	....	....	
1,600	160,000	.00582	.00017	....	....	
1,650	165,000	.00602	.00020	....	....	
1,700	170,000	.00622	.00020	....	....	
1,750	175,000	.00648	.00026	....	....	
1,800	180,000	.00668	.00020	....	....	
1,850	185,000	.00688	.00020	....	....	
1,900	190,000	.00708	.00020	....	....	Elastic limit.
1,950	195,000	.00738	.00030	....	....	
2,000	200,000	.00782	.00044	....	....	
2,050	205,000	.00940	.00158	....	....	
2,100	210,000	.01475	.00535	....	....	
2,150	215,000	.021	.00625	....	....	
2,187	218,700	.034	.013	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	218,700
Elastic limit per square inch of original section	do	190,000
Elongation per inch after rupture	inch	0.027
Elongation per inch under strain at elastic limit	do	.00708
Reduction in area after rupture, per centum of original section		45.0
Position of rupture		3″.85 inside the gauged section
Character of broken surface		fine silky

No. 2851.

COIL NO. 72. WEIGHT, 27¾ POUNDS.

Inside end of coil.
Sectional area, ″.0992 × ″.0995=.0099 square inch.
Outside end measures ″.1023 × ″.1005.
Gauged length, 10″.
Coils over its diagonal with difficulty.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	
495	50, 000	.00182	.00182	....	....	Initial load.
990	100, 000	.00368	.00186	....	....	
1, 485	150, 000	.00558	.00190	....	....	
1, 535	155, 000	.00578	.00020	....	....	
1, 584	160, 000	.00594	.00016	....	....	
1, 634	165, 000	.00610	.00016	....	....	
1, 683	170, 000	.00630	.00020	....	....	
1, 733	175, 000	.00650	.00020	....	....	
1, 782	180, 000	.00670	.00020	....	....	
1, 832	185, 000	.00691	.00021	....	....	
1, 881	190, 000	.00716	.00025	....	....	Elastic limit.
1, 931	195, 000	.00744	.00028	....	....	
1, 980	200, 000	.00778	.00034	....	....	
2, 030	205, 000	.00918	.00140	....	....	
2, 079	210, 000	.014	.00482	....	....	
2, 129	215, 000	.018	.004	....	....	
2, 170	219, 190	.032	.014	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	219, 190
Elastic limit per square inch of original section	do...	190, 000
Elongation per inch after rupture	inch..	0. 017
Elongation per inch under strain at elastic limit	do...	.00716
Reduction in area after rupture, per centum, of original section		43 4
Position of rupture		3″. outside the gauged section
Character of broken surface		fine silky

No. 2852.

COIL, NO. 73. WEIGHT, 26¼ POUNDS.

Outside end of coil.
Sectional area, ″.1006 × ″.0996 = .010 square inch.
Inside end measures ″.0995 × ″.0990.
Gauged length, 10″.
Coils over its diagonal with difficulty.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00180	.00180	....	....	
1,000	100,000	.00360	.00180	....	....	
1,500	150,000	.00552	.00192	....	....	
1,550	155,000	.00570	.00018	....	....	
1,600	160,000	.00588	.00018	....	....	
1,650	165,000	.00615	.00027	....	....	
1,700	170,000	.00638	.00023	....	....	
1,750	175,000	.00654	.00016	....	....	
1,800	180,000	.00678	.00024	....	....	
1,850	185,000	.00698	.00020	....	....	
1,900	190,000	.00717	.00019	....	....	
1,950	195,000	.00737	.00020	....	....	Elastic limit.
2,000	200,000	.00772	.00035	....	....	
2,050	205,000	.00818	.00046	....	....	
2,100	210,000	.01470	.00652	....	....	
2,146	214,600	.022	.00730	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	214,600
Elastic limit per square inch of original section	do...	195,000
Elongation per inch after rupture	inch..	0.007
Elongation per inch under strain at elastic limit	do...	.00737
Reduction in area after rupture, per centum of original section		42.0
Position of rupture		10″ outside the gauged length
Character of broken surface		fine silky.

No. 2853.

COIL NO. 74. WEIGHT, 44 POUNDS.

Specimen taken 100 feet from outside end of coil.
Sectional area, ''.1006 × ''.1005 = .0101 square inch.
Inside end measures ''.0996 × ''.0994.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
505	50,000	.00175	.00175			
1010	100,000	.00359	.00184			
1515	150,000	.00543	.00184			
1565	155,000	.00560	.00017			
1616	160,000	.00578	.00018			
1666	165,000	.00598	.00020			
1717	170,000	.00618	.00020			
1767	175,000	.00638	.00020			
1818	180,000	.00657	.00019			
1868	185,000	.00678	.00021			
1919	190,000	.00697	.00019			
1969	195,000	.00719	.00022			
2020	200,000	.00739	.00020			Elastic limit.
2070	205,000	.00786	.00047			
2121	210,000	.00945	.00159			
2171	215,000	.01320	.00375			
2222	220,000	.019	.00580			
2272	225,000	.032	.013			
2287	226,440	.036	.004			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	226,440
Elastic limit per square inch of original section	do	200,000
Elongation per inch after rupture	inch	0.020
Elongation per inch under strain at elastic limit	do	.00739
Reduction in area after rupture, per centum of original section		36.6
Position of rupture		9''.8 outside the gauged section
Character of broken surface		fine silky

No. 2854.

COIL NO. 75. WEIGHT, 29 POUNDS.

Inside end of coil.
Sectional area, ″.1002 × ″.0997 = .010 square inch.
Outside end measures ″.1012 × ″.1008.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00168	.00168			
1,000	100,000	.00357	.00189			
1,500	150,000	.00537	.00180			
1,550	155,000	.00548	.00011			
1,600	160,000	.00568	.00020			
1,650	165,000	.00588	.00020			
1,700	170,000	.00608	.00020			
1,750	175,000	.00627	.00019			
1,800	180,000	.00647	.00020			
1,850	185,000	.00667	.00020			
1,900	190,000	.00687	.00020			
1,950	195,000	.00707	.00020			
2,000	200,000	.00727	.00020			Elastic limit.
2,050	205,000	.00768	.00041			
2,100	210,000	.00813	.00045			
2,150	215,000	.00980	.00167			
2,200	220,000	.013	.00320			
2,250	225,000	.016	.003			
2,300	230,000	.022	.006			
2,322	232,200	.031	.009			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	232,200
Elastic limit per square inch of original section	do	200,000
Elongation per inch after rupture	inch	0.020
Elongation per inch under strain at elastic limit	do	.00727
Reduction in area after rupture, per centum of original section		36.0
Position of rupture		1″.85 outside the gauged section
Character of broken surface		fine silky

No. 2855.

COIL NO. 76. WEIGHT, 26½ POUNDS.

Outside end of coil.
Sectional area, ″.1002 × ″.0988 =.0099 square inch.
Inside end measures same as outside.
Gauged length, 10.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	
495	50, 000	.00168	.00168	....	....	Initial load.
990	100, 000	.00349	.00181	....	....	
1, 485	150, 000	.00537	.00188	....	....	
1, 535	155, 000	.00551	.00014	....	....	
1, 584	160, 000	.00569	.00018	....	....	
1, 634	165, 000	.00588	.00019	....	....	
1, 683	170, 000	.00607	.00019	....	....	
1, 733	175, 000	.00627	.00020	....	....	
1, 782	180, 000	.00654	.00027	....	....	
1, 832	185, 000	.00676	.00022	....	....	
1, 881	190, 000	.00698	.00022	....	....	Elastic limit.
1, 931	195, 000	.00750	.00052	....	....	
1, 980	200, 000	.01680	.00930	....	....	
2, 030	205, 000	.028	.01120	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....pounds..	205, 000
Elastic limit per square inch of original section....do...	190, 000
Elongation per inch after rupture....inch..	0. 014
Elongation per inch under strain at elastic limit....do...	.00698
Reduction in area after rupture, per centum of original section....	38. 4
Position of rupture....	7″. 25 outside the gauged section
Character of broken surface....	fine silky

No. 2856.

COIL NO. 77. WEIGHT, 26 POUNDS.

Inside end of coil.
Sectional area, ″.0997 × .0998 = .0099 square inch.
Outside end measures ″.1015 × ″.1014.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00171	.00171	....	....	
990	100,000	.00350	.00179	....	....	
1,485	150,000	.00527	.00177	....	....	
1,535	155,000	.00543	.00016	....	....	
1,584	160,000	.00563	.00020	....	....	
1,634	165,000	.00583	.00020	....	....	
1,683	170,000	.00603	.00020	....	....	
1,733	175,000	.00623	.00020	....	....	
1,782	180,000	.00643	.00020	....	....	
1,832	185,000	.00663	.00020	....	....	
1,881	190,000	.00683	.00020	....	....	Elastic limit.
1,931	195,000	.00710	.00027	....	....	
1,980	200,000	.00745	.00035	....	....	
2,030	205,000	.00785	.00040	....	....	
2,079	210,000	.017	.00915	....	....	
2,129	215,000	.028	.011	....	....	
2,150	217,170	.035	.007	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	217,170
Elastic limit per square inch of original section	do...	190,000
Elongation per inch after rupture	inch..	0.021
Elongation per inch under strain at elastic limit	do...	.00683
Reduction in area after rupture, per centum of original section		38.4
Position of rupture		3″ outside the gauged section
Character of broken surface		fine silky

No. 2857.

COIL No. 78. WEIGHT, 51¾ POUNDS.

Specimens taken 100 feet from outside end of coil.
Sectional area, ″.1006 × ″.1003 = .010 square inch.
Inside end measures, ″.0998 × ″.0998.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
500	50,000	.00168	.00168	....	....	
1,000	100,000	.00348	.00180	....	....	
1,500	150,000	.00538	.00190	....	....	
1,550	155,000	.00550	.00012	....	....	
1,600	160,000	.00564	.00014	....	....	
1,650	165,000	.00584	.00020	....	....	
1,700	170,000	.00602	.00018	....	....	
1,750	175,000	.00622	.00020	....	....	
1,800	180,000	.00641	.00019	....	....	
1,850	185,000	.00660	.00019	....	....	
1,900	190,000	.00681	.00021	....	....	
1,950	195,000	.00705	.00024	....	....	
2,000	200,000	.00730	.00025	....	....	Elastic limit.
2,050	205,000	.00758	.00028	....	....	
2,100	210,000	.00805	.00047	....	....	
2,150	215,000	.01015	.00210	....	....	
2,200	220,000	.016	.00585	....	....	
2,250	225,000	.021	.005	....	....	
2,288	228,800	.040	.019	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	228,800
Elastic limit per square inch of original section	do	200,000
Elongation per inch after rupture	inch	0.031
Elongation per inch under strain at elastic limit	do	.00730
Reduction in area after rupture, per centum of original section		39.0
Position of rupture		2″.4 inside the gauged section
Character of broken surface		fine silky

No. 2858.

COIL NO. 79. WEIGHT, 68¾ POUNDS.

Inside end of coil.
Sectional area, ″.0996 × ″.0996 =.0099 square inch.
Outside end measures ″.1025 × ″.1025.
Gauged length, ″.10.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00173	.00173	....	....	
990	100, 000	.00353	.00180	....	....	
1, 485	150, 000	.00533	.00180	....	....	
1, 535	155, 000	.00553	.00020	....	....	
1, 584	160, 000	.00573	.00020	....	....	
1, 634	165, 000	.00587	.00014	....	....	
1, 683	170, 000	.00603	.00016	....	....	
1, 733	175, 000	.00623	.00020	....	....	
1, 782	180, 000	.00643	.00020	....	....	
1, 832	185, 000	.00663	.00020	....	....	
1, 881	190, 000	.00683	.00020	....	....	
1, 931	195, 000	.00703	.00020	....	....	
1, 980	200, 000	.00723	.00020	....	....	
2, 030	205, 000	.00748	.00025	....	....	
2, 079	210, 000	.00773	.00025	....	....	Elastic limit.
2, 129	215, 000	.00823	.00050	....	....	
2, 178	220, 000	.01060	.00237	....	....	
2, 228	225, 000	.015	.00440	....	....	
2, 277	230, 000	.023	.008	....	....	
2, 299	232, 220	.037	.014	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	232, 220
Elastic limit per square inch of original section	do....	210, 000
Elongation per inch after rupture	inch..	0. 020
Elongation per inch under strain at elastic limit	do....	.00773
Reduction in area after rupture, per centum of original section		43. 4
Position of rupture		6″.3 outside the gauged section
Character of broken surface		fine silky

No. 2859.

COIL NO. 80. WEIGHT, 73¾ POUNDS.

Specimen taken 100 feet from outside end of coil.
Sectional area, ″.0996 × ″.0997 = .0099 square inch.
Inside end measures ″.1018 × ″.1018.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5, 000	0.	0.	0.	0.	Initial load.
495	50, 000	.00173	.00173	....	....	
990	100, 000	.00350	.00177	....	....	
1, 485	150, 000	.00528	.00178	....	....	
1, 535	155, 000	.00548	.00020	....	....	
1, 584	160, 000	.00568	.00020	....	....	
1, 634	165, 000	.00583	.00015	....	....	
1, 683	170, 000	.00599	.00016	....	....	
1, 733	175, 000	.00617	.00018	....	....	
1, 782	180, 000	.00640	.00023	....	....	
1, 832	185, 000	.00660	.00020	....	....	
1, 881	190, 000	.00678	.00018	....	....	
1, 931	195, 000	.00703	.00025	....	....	
1, 980	200, 000	.00730	.00027	....	....	Elastic limit.
2, 030	205, 000	.00778	.00048	....	....	
2, 079	210, 000	.013	.00522	....	....	
2, 129	215, 000	.016	.003	....	....	
2, 178	220, 000	.040	.024	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	220, 000
Elastic limit per square inch of original section	do	200, 000
Elongation per inch after rupture	inch	0. 025
Elongation per inch under strain at elastic limit	do	.00730
Reduction in area after rupture, per centum of original section		40. 4
Position of rupture		1″.65 outside the gauged section
Character of broken surface		fine silky

No. 2860.

COIL NO. 81. WEIGHT, 32¼ POUNDS.

Inside end of coil.
Sectional area ″.0994 × ″.1002 =.0099 square inch.
Outside end measures ″.0998 × ″.1017.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00167	.00167			
990	100,000	.00343	.00176			
1,485	150,000	.00530	.00187			
1,535	155,000	.00546	.00016			
1,584	160,000	.00565	.00019			
1,634	165,000	.00580	.00015			
1,683	170,000	.00600	.00020			
1,733	175,000	.00622	.00022			
1,782	180,000	.00642	.00020			
1,832	185,000	.00666	.00024			
1,881	190,000	.00690	.00024			Elastic limit.
1,931	195.000	.00720	.00030			
1,980	200,000	.00760	.00040			
2,030	205,000	.00990	.00230			
2,079	210,000	.01975	.00985			
2,125	214,650	.033	.01325			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	214,650
Elastic limit per square inch of original section	do	190,000
Elongation per inch after rupture	inch	0.026
Elongation per inch under strain at elastic limit	do	.00690
Reduction in area after rupture, per centum of original section		41.4
Position of rupture		″.65 inside the gauged section
Character of broken surface		fine silky

No. 2861.

COIL NO. 82. WEIGHT, 72 POUNDS.

Outside end of coil.
Sectional area, ″.1019 × ″.1016 = .0103 square inch.
Inside end measures ″.1000 × ″.1000.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
515	50, 000	.00182	.00182	....	....	
1, 030	100, 000	.00368	.00186	....	....	
1, 545	150, 000	.00538	.00170	....	....	
1, 596	155, 000	.00562	.00024	....	....	
1, 648	160, 000	.00582	.00020	....	....	
1, 699	165, 000	.00600	.00018	....	....	
1, 751	170, 000	.00623	.00023	....	....	
1, 802	175, 000	.00647	.00024	....	....	
1, 854	180, 000	.00662	.00015	....	....	
1, 905	185, 000	.00682	.00020	....	....	
1, 957	190, 000	.00702	.00020	....	....	
2, 008	195, 000	.00719	.00017	....	....	Elastic limit.
2, 060	200, 000	.00748	.00029	....	....	
2, 111	205, 000	.00778	.00030	....	....	
2, 163	210, 000	.00815	.00037	....	....	
2, 214	215, 000	.01020	.00205	....	....	
2, 265	220, 000	.016	.00580	....	....	
2, 317	225, 000	.034	.018	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	225, 000
Elastic limit per square inch of original section	do	195, 000
Elongation per inch after rupture	inch	0. 010
Elongation per inch under strain at elastic limit	do	.00719
Reduction in area after rupture per centum of original section		37. 9
Position of rupture		4″ outside the gauged length
Character of broken surface		fine silky

No. 2862.

COIL NO. 83. WEIGHT, 72 POUNDS.

Inside end of coil.
Sectional area, ″.1004 × ″.0997 = .010 square inch.
Outside end measures ″.1024 × ″.1031.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
500	50, 000	.00170	.00170	....	....	
1, 000	100, 000	.00348	.00178	....	....	
1, 500	150, 000	.00532	.00184	....	....	
1, 550	155, 000	.00558	.00026	....	....	
1, 600	160, 000	.00572	.00014	....	....	
1, 650	165, 000	.00586	.00014	....	....	
1, 700	170, 000	.00605	.00019	....	....	
1, 750	175, 000	.00622	.00017	....	....	
1, 800	180, 000	.00645	.00023	....	....	
1, 850	185, 000	.00663	.00018	....	....	
1, 900	190, 000	.00682	.00019	....	....	
1, 950	195, 000	.00702	.00020	....	....	
2, 000	200, 000	.00722	.00020	....	....	Elastic limit.
2, 050	205, 000	.00758	.00036	....	....	
2, 100	210, 000	.00917	.00159	....	....	
2, 150	215, 000	.016	.00683	....	....	
2, 195	219, 500	.025	.009	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..................pounds..	219, 500
Elastic limit per square inch of original section ....do...	200, 000
Elongation per inch after rupture..................inch..	0. 010
Elongation per inch under strain at elastic limit..................do...	.00722
Reduction in area after rupture, per centum of original section..................	39. 0
Position of rupture..................	10″.75 outside the gauged section
Character of broken surface	fine silky

No. 2863.

COIL NO. 84. WEIGHT, 69¼ POUNDS.

Outside end of coil.
Sectional area, ″.0994 × ″.0996 = .0099 square inch.
Inside end measures ″.1002 × ″.1002.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
495	50,000	.00188	.00188	....	....	
990	100,000	.00356	.00168	....	....	
1,485	150,000	.00528	.00172	....	....	
1,535	155,000	.00548	.00020	....	....	
1,584	160,000	.00568	.00020	....	....	
1,634	165,000	.00584	.00016	....	....	
1,683	170,000	.00603	.00019	....	....	
1,733	175,000	.00620	.00017	....	....	
1,782	180,000	.00644	.00024	....	....	
1,832	185,000	.00665	.00021	....	....	
1,881	190,000	.00685	.00020	....	....	Elastic limit.
1,931	195,000	.00722	.00037	....	....	
1,980	200,000	.012	.00478	....	....	
2,030	205,000	.015	.003	....	....	
2,070	209,090	.021	.006	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	209,090
Elastic limit per square inch of original section	do...	190,000
Elongation per inch after rupture	inch..	0.009
Elongation per inch under strain at elastic limit	do...	.00685
Reduction in area after rupture, per centum of original section		41.4
Position of rupture		4″.25 outside the gauged section
Character of broken surface		fine silky

No. 2864.

COIL NO. 85. WEIGHT, 74½ POUNDS.

Specimen taken from near the middle of the coil, the parts on either side weighing 38¾ and 35¾ pounds respectively.

Sectional area, ″.1003 × ″.0997=.010 square inch.

Outside end measures ″.1000 × ″.0993.

Inside end measures ″.1015 × ″.1011.

Gauged length, 10″.

Applied loads.		Elongation. per inch	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
500	50, 000	.00184	.00184	....	....	
1, 000	100, 000	.00362	.00178	....	....	
1, 500	150, 000	.00547	.00185	....	....	
1, 550	155, 000	.00568	.00021	....	....	
1, 600	160, 000	.00584	.00016	....	....	
1, 650	165, 000	.00598	.00014	....	....	
1, 700	170, 000	.00622	.00024	....	....	
1, 750	175, 000	.00642	.00020	....	....	
1, 800	180, 000	.00665	.00023	....	....	
1, 850	185, 000	.00680	.00015	....	....	
1, 900	190, 000	.00695	.00015	....	....	
1, 950	195, 000	.00708	.00013	....	....	
2, 000	200, 000	.00726	.00018	....	....	Elastic limit.
2, 050	205, 000	.00759	.00033	....	....	
2, 100	210, 000	.00795	.00036	....	....	
2, 150	215, 000	.00875	.00080	....	....	
2, 200	220, 000	.014	.00525	....	....	
2, 250	225, 000	.018	.004	....	....	
2, 290	229, 000	.030	.012	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	229.000
Elastic limit per square inch of original section	do	200, 000
Elongation per inch after rupture	inch	0.012
Elongation per inch under strain at elastic limit	do	.00726
Reduction in area after rupture, per centum of original section	do	41.0
Position of rupture		12″.7 outside the gauged section
Character of broken surface		fine silky

TABULATION OF TENSILE TESTS OF SQUARE STEEL WIRE.

FIRST LOT, ".15 SQUARE.

Coil and weight.	No. of test.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Contraction of area.	Appearance of fracture.	Remarks.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.					
		Inch.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*	*Per cent.*		
First coil, weight 17¼ lbs	2541	.1480	.1483	.0219	2, 190	100, 000	3, 206	146, 390	.25	2.5	28.7	Silky serrated	
	2542	.1480	.1483	.0219	1, 971	90, 000	3, 175	145, 000	.20	2.0	28.7	Silky	
	2543	.1480	.1483	.0219	2, 190	100, 000	3, 210	146, 580	.19	1.9	22.8	....do	
	2544	.1476	.1484	.0219	......	......	3, 192	145, 750	......	......	......	....do	Fractured at section in wire that was not square (nearly round).
	2545	.1480	.1483	.0219	657	30, 000	1, 971	90, 000	.87	8.7	58.9	Fine silky	Partially annealed.
	2546	.1480	.1483	.0219	657	30, 000	2, 018	92, 150	.98	9.8	58.9	....do	
Second coil, weight 23 lbs	2547	.1492	.1488	.0222	2, 331	105, 000	3, 710	167, 120	.12	1.2	29.7	Silky	
	2548	.1492	.1488	.0222	2, 442	110, 000	3, 663	165, 000	.22	2.2	23.9	Silky, slightly granular.	
	2549	.1492	.1488	.0222	2, 442	110, 000	3, 650	164, 410	.07	0.7	29.7	Silky	
Third coil, weight 18¾ lbs	2550	.1492	.1488	.0222	1, 776	80, 000	3, 164	142, 520	.09	0.9	29.7	....do	
	2551	.1492	.1488	.0222	1, 998	90, 000	3, 174	142, 970	.13	1.3	29.7	Silky, trace of granulation.	
	2552	.1492	.1488	.0222	2, 220	100, 000	3, 193	143, 830	.13	1.3	23.9	Silky	

FIRST LOT, ".10 SQUARE.

Coil and weight.	No. of test.	Width.	Thickness.	Sectional area.	Elastic limit, total.	Elastic limit, per square inch.	Ultimate strength, total.	Ultimate strength, per square inch.	Elongation, inch.	Elongation, per ct.	Contraction of area.	Appearance of fracture.	Remarks.
First coil, weight 23¾ lbs	2553	.1003	.1013	.0100	950	95, 000	1, 528	152, 800	.09	0.9	36.0	Silky	
	2554	.1003	.1013	.0100	1, 000	100, 000	1, 498	149, 800	.06	0.6	36.0	....do	
	2555	.1003	.1013	.0100	950	95, 000	1, 526	152, 600	.09	0.9	28.0	....do	
	2556	.1003	.1013	.0100	350	35, 000	882	88, 200	.46	4.6	55.0	....do	
	2557	.1003	.1013	.0100	350	35, 000	845	84, 500	.64	6.4	58.0	....do	Partially annealed.
Second coil, weight 34½ lbs	2558	.1016	.1016	.0103	978	95, 000	1, 514	146, 990	.12	1.2	37.9	....do	
	2559	.1016	.1016	.0103	1, 030	100, 000	1, 522	147, 770	.17	1.7	43.7	....do	
	2560	.1016	.1016	.0103	978	95, 000	1, 519	147, 480	.12	1.2	43.7	....do	

TABULATION OF TENSILE TESTS OF SQUARE STEEL WIRE—Continued.

SECOND LOT, ″.10 SQUARE.

No. of test.	Kind of wire.	Marks.	Dimensions of wire.	Sectional area.	Elastic limit.		Tensile strength.		Elongation in 10 inches.		Area of fracture.	Contraction of area.	Fracture.	Remarks.
					Total.	Per square inch.	Total.	Per square inch.						
			Inch. Inch.	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*	*In. . In. Sq. in.*	*Per ct.*		
2581	Tinned	1	.1003×.0102	.0100	1,100	110,000	1,560	156,000	.07	0.7	.075×.075=.0056	44.0	Silky ...	Not coiled.
2582	....do	1	.1006×.1004	.0101	1,111	110,000	1,545	152,970	.17	1.7	.078×.078=.0061	39.6	...do	Do.
2583	....do	1	.1004×.1003	.0100	1,000	100,000	1,572	157,200	.16	1.6	.077×.077=.0059	41.0	...do	Do.
2584	....do	1	.1008×.1008	.0101	1,010	100,000	1,592	157,600	.17	1.7	.077×.077=.0059	41.5	...do	
2585	....do	1	.1008×.1008	.0101	1,010	100,000	1,588	157,230	.19	1.9	.075×.075=.0056	44.6	...do	
2586	....do	1	.1008×.1008	.0101	1,011	110,000	1,621	160,500	.17	1.7	.075×.075=.0056	44.6	...do	
2587	....do	1	.1010×.1010	.0102	918	90,000	1,507	147,750	.24	2.4	.078×.078=.0061	40.2	...do	Straightened between rolls.
2588	....do	1	.1010×.1010	.0102	969	95,000	1,505	147,550	.14	1.4	.077×.077=.0059	42.2	...do	Do.
2589	....do	1	.1010×.1010	.0102	1,020	100,000	1,504	147,450	.24	2.4	.078×.078=.0061	40.2	...do ...	Do.
2590	Oil-tempered..	6–3	.1000×.1002	.0100	1,750	175,000	2,045	204,500	.16	1.6	.075×.075=.0056	44.0	...do	
2591	....do	6–3	.1000×.1002	.0100	1,800	180,000	2,138	213,800	.21	2.1	.076×.076=.0058	42.0	...do	
2592	....do	6–3	.1000×.1002	.0100	1,750	175,000	1,995	199,500	.05	0.5	.075×.075=.0056	44.0	...do	
2593	....do	6–2	.0995×.0997	.0099	1,534	155,000	1,782	180,000	.33	3.3	.072×.072=.0052	47.5	...do	
2594	....do	6–2	.0995×.0997	.0099	1,485	150,000	1,764	178,180	.21	2.1	.073×.073=.0053	46.5	...do	
2595	....do	6–2	.0995×.0997	.0099	1,485	150,000	1,780	179,800	.30	3.0	.071×.071=.0050	49.5	...do	
2596	....do	6–1	.1000×.1000	.0100	1,650	165,000	1,842	184,200	.18	1.8	.074×.074=.0055	45.0	...do	
2597	....do	6–1	.1000×.1000	.0100	1,600	160,000	1,828	182,800	.20	2.0	074×.074=.0055	45.0	...do	
2598	....do	6–1	.1000×.1000	.0100	1,600	160,000	1,750	175,000	.06	0.6	.077×.077=.0059	41.0	...do	
2599	Tinned	4	.1010×.1008	.0102	1,122	110,000	1,648	161,570	.27	2.7	.083×.083=.0069	32.4	...do	Straightened between rolls.
2600	....do	4	.1010×.1008	.0102	1,071	105,000	1,646	161,370	.22	2.2	.080×.080=.0064	37.3	...do	Do.
2601	....do	4	.1010×.1008	.0102	1,122	110,000	1,622	159,020	.20	2.0	.080×.080=.0064	37.3	...do	Do.
2602	....do	3	.1014×.1007	.0102	1,020	100,000	1,598	156,670	.20	2.0	.084×.084=.0071	30.4	...do	Do.
2603	....do	3	.1014×.1007	.0102	1,020	100,000	1,607	157,550	.16	1.6	.080×.080=.0064	37.3	...do	Do.
2604	....do	3	.1014×.1007	.0102	1,020	100,000	1,628	159,610	.10	1.0	.079×.079=.0062	39.2	...do	Do.
2605	Not tinned....	2	.1012×.1010	.0102	969	95,000	1,570	153,920	.15	1.5	.076×.076=.0058	43.1	...do	Not coiled.
2606	....do	2	.1012×.1010	.0102	1,020	100,000	1,588	155,690	.20	2.0	.075×.075=.0056	45.1	...do	Do.
2607	....do	2	.1012×.1010	.0102	1,071	105,000	1,570	153,920	.19	1.9	.075×.075=.0056	45.1	...do	Do.
2808	....do	2	.1006×.1006	.0101	1,010	100,000	1,560	154,460	.25	2.5	.074×.074=.0055	45.5	...do	Straightened between rolls.
2609	....do	2	.1006×.1006	.0101	1,060	105,000	1,565	155,000	.14	1.4	.073×.073=.0053	47.5	...do	Do.
2610	....do	2	.1006×.1006	.0101	959	95,000	1,550	153,470	.22	2.2	.079×.079=.0062	38.6	...do	Do.
2611	Galvanized ...	1	.1010×.1010	.0102	918	90,000	1,544	151,370	.35	3.5	.081×.081=.0066	35.3	...do	Do.
2612	....do	1	.1010×.1010	.0102	816	80,000	1,518	148,820	.58	5.8	.077×.077=.0059	42.2	...do	Do.
2613	....do	1	.1010×.1010	.0102	918	90,000	1,562	153,140	.49	4.9	.077×.077=.0059	42.2	...do	Do.

THIRD LOT, ".10 SQUARE TINNED STEEL WIRE.

No. of test.	Mark on coil.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Location of specimen in coil.	Weight of coil.
		Width.	Thickness.		Total.	Per sq. inch.	Total.	Per sq. inch.							
		Inch.	*Inch.*	*Sq. in.*	*Pounds*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*	*In. In. Sq. in.*	*Per ct.*			*Pounds*
2779	1	.1010	.1006	.0101	1,616	160,000	1,871	185,250	......	......	.066×.066=.0044	56.5	Fine silky*	Outside end	28½
2780	2	.1000	.1006	.0100	1,450	145,000	1,800	180,000	.13	1.3	.080×.080=.0064	36.0	do	Inside end	37
2781	3	.1003	.1004	.0100	1,600	160,000	1,798	179,800	.14	1.4	.082×.082=.0067	33.0	do	Outside end	31
2782	4	.1010	.1003	.0101	1,919	190,000	2,146	212,480	.14	1.4	.075×.075=.0056	44.6	do	100 feet from outside end	71½
2783	5	.1020	.1006	.0102	1,785	175,000	2,029	198,920	.08	0.8	.087×.087=.0076	25.5	do*	Inside end	25
2784	6	.1003	.0997	.0100	1,700	170,000	1,920	192,000	.20	2.0	.096×.096=.0092	8.0	Silky	do	29½
2785	7	.1013	.1004	.0105	1,942	185,000	2,257	215,000	.15	1.5	.078×.078=.0061	41.9	Fine silky	Outside end	47¾
2786	8	.1004	.0997	.0100	1,900	190,000	2,224	222,400	.16	1.6	.085×.085=.0072	28.0	do	Inside end	37¼
2787	9	.1005	.0994	.0100	1,900	190,000	2,193	219,300	.25	2.5	.085×.085=.0072	28.0	do*	Outside end	36¼
2788	10	.0997	.0996	.0099	1,733	175,000	1,980	200,000	.09	0.9	......	......	do	Inside end	28½
2789	11	.1020	.1016	.0103	2,009	195,000	2,288	221,140	.18	1.8	......	......	do	Outside end	37¼
2790	11	.1008	.1006	.0101	1,919	190,000	2,239	221,680	.15	1.5	.080×.080=.0064	36.6	do	Inside end	......
2791	12	.1002	.0998	.0100	1,900	190,000	2,108	210,800	.25	2.5	.078×.078=.0061	39.0	do	do	32¼
2792	13	.1021	.1006	.0102	1,632	160,000	1,918	188,040	.12	1.2	.080×.080=.0064	37.3	do*	100 feet from outside end	59
2793	14	.1011	.1005	.0101	1,919	190,000	2,152	213,070	.20	2.0	.075×.075=.0056	44.6	do	Inside end	34¾
2794	15	.0996	.0996	.0099	1,831	185,000	2,090	211,110	.07	0.7	.077×.077=.0059	40.4	do	Outside end	34
2795	16	.0999	.0990	.0099	1,831	185,000	2,093	211,410	.26	2.6	.079×.079=.0062	37.4	do	Inside end	34
2796	17	.0997	.0997	.0099	1,930	195,000	2,110	213,120	.19	1.9	.076×.076=.0058	41.4	do	Outside end	26¼
2797	18	.1000	.1000	.0100	1,700	170,000	1,942	194,200	.17	1.7	.076×.076=.0058	42.0	do	Near middle	71¾
2798	19	.0996	.0996	.0099	1,584	160,000	1,771	178,890	.07	0.7	.078×.078=.0061	38.3	do	100 feet from outside end	47¼
2799	20	.1000	.0986	.0098	1,519	155,000	1,875	191,330	.06	0.6	.077×.077=.0059	39.8	do	Inside end	42¾
2800	21	.1016	.1026	.0104	1,664	160,000	1,924	185,000	.10	1.0	.078×.078=.0061	41.3	do	Outside end	23¾
2801	22	.1002	.0997	.0100	1,850	185,000	2,068	206,800	.26	2.6	.078×.078=.0061	39.0	do*	Inside end	33¼
2802	23	.0998	.0992	.0099	1,831	185,000	2,048	206,870	.18	1.8	.077×.077=.0059	40.4	do	Outside end	25¼
2803	24	.0994	.0997	.0099	1,782	180,000	2,019	203,030	.17	1.7	.095×.095=.0090	9.1	Silky, irregular	Inside end	34¼
2804	25	.0995	.0990	.0098	1,666	170,000	2,040	208,160	.12	1.2	.076×.076=.0058	40.8	Fine silky*	Outside end	37½
2805	26	.1003	.0998	.0100	1,900	190,000	2,102	210,200	.18	1.8	.076×.076=.0058	42.0	do	Inside end	39¼
2806	27	.1026	.1016	.0104	1,976	190,000	2,231	214,520	.20	2.0	.080×.080=.0064	38.4	do	100 feet from outside end	33½
2807	28	.0988	.0988	.0098	1,911	195,000	2,178	222,240	.30	3.0	.085×.085=.0072	26.5	do*	Inside end	25¼
2808	29	.1004	.1016	.0102	1,887	185,000	2,150	208,820	.10	1.0	.080×.080=.0064	37.3	do	Outside end	30¾
2809	30	.1003	.0998	.0100	1,750	175,000	2,042	204,200	.12	1.2	.080×.080=.0064	36.0	do	Near the middle	70¼
2810	31	.0996	.0996	.0099	1,732	175,000	2,010	203,030	.18	1.8	.081×.081=.0066	33.3	do*	Inside end	23½
2811	32	.1000	.1000	.0100	1,800	180,000	2,111	211,100	.21	2.1	.075×.075=.0056	44.0	do*	Outside end	29¼
2812	33	.1002	.0997	.0100	1,850	185,000	2,122	212,200	.28	2.8	.080×.080=.0064	36.0	do*	100 feet from outside end	69¾
2813	34	.1002	.0990	.0099	1,980	200,000	2,221	224,340	.16	1.6	.097×.097=.0094	5.1	do	Inside end	62¾
2814	35	.1000	.0996	.0099	1,584	160,000	1,775	179,290	......	......	.077×.077=.0059	40.4	do	Outside end	41¼
2815	36	.0986	.0996	.0098	1,715	175,000	2,000	204,080	.12	1.2	.075×.075=.0056	42.9	do	Inside end	27½
2816	37	.0998	.0997	.0099	1,930	195,000	2,198	222,020	.13	1.3	.078×.078=.0061	38.4	do	Outside end	34¾
2817	38	.1008	.1007	.0100	1,818	180,000	2,096	207,520	.20	2.0	.080×.080=.0064	36.6	do	Inside end	60¾
2818	39	.0986	.0996	.0098	1,813	185,000	2,032	207,350	.20	2.0	.073×.073=.0053	45.9	do	Outside end	41¾

* Fractured inside the gauger section.

TABULATION OF TENSILE TESTS OF SQARE STEEL WIRE—Continued.

THIRD LOT, ″.10 SQUARE TINNED STEEL WIRE—Continued.

No. of test.	Mark on coil.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Location of specimen in coil.	Weight of coil.
		Width.	Thickness.		Total.	Per sq. inch.	Total.	Per sq. inch.							
		Inch.	*Inch.*	*Sq. in.*	*Pounds*	*Pounds.*	*Pounds*	*Pounds.*	*Inch.*	*Per ct.*	*In. In. Sq. in.*	*Per ct.*			*Pounds*
2819	40	.1000	.0998	.0099	1,831	185,000	2,100	212,120	.34	3.4	.073×.073=.0053	46.5	Fine silky*	Inside end	28¾
2820	41	.0995	.0995	.0099	1,930	195,000	2,176	219,800	.27	2.7	.075×.075=.0056	43.4	do*	Outside end	27¼
2821	42	.1001	.0994	.0099	1,881	190,000	2,178	220,000	.23	2.3	.078×.078=.0061	38.4	do*	100 feet from inside end	37¾
2822	43	.1000	.1000	.0100	1,950	195,000	2,176	217,600	.14	1.4	.073×.073=.0053	47.0	do.	Inside end	39½
2823	44	.1004	.0996	.0100	2,000	200,000	2,186	218,600	.20	2.0	.079×.079=.0062	38.0	do	Outside end	47¼
2824	45	.1004	.1005	.0101	1,869	185,000	2,222	215,000	.17	1.7	.080×.080=.0064	36.6	do	Inside end	71¾
2825	46	.0994	.0996	.0099	1,733	175,000	1,967	198,680	.16	1.6	.080×.080=.0064	35.4	do	Outside end	29
2826	47	.1001	.0994	.0099	1,782	180,000	1,980	200,000	.30	3.0	.076×.076=.0058	41.4	do*	Near the middle	73¾
2827	48	.1024	.0996	.0102	1,581	155,000	1,872	183,530	......	......	.081×.081=.0066	35.3	do	Inside end	25
2828	49	.1006	.1012	.0101	1,919	190,000	2,222	220,000	.28	2.8	.075×.075=.0056	44.6	do*	Outside end	73¾
2829	50	.1004	.1006	.0101	1,767	175,000	1,989	196,300	.23	2.3	.075×.075=.0056	44.6	do	Inside end	24¾
2830	51	.1000	.1000	.0100	1,950	195,000	2,175	217,500	.13	1.3	.075×.075=.0056	44.0	do	Outside end	27½
2831	52	.0994	.0993	.0099	1,634	165,000	1,890	190,910	.15	1.5	.076×.076=.0058	41.4	do*	Inside end	41¼
2832	53	.1004	.0996	.0100	1,650	165,000	1,942	194,200	.19	1.9	.077×.077=.0059	41.0	do*	Outside end	17½
2833	54	.0997	.0998	.0099	1,782	180,000	2,000	202,020	.08	0.8	.080×.080=.0064	35.3	do	do	35¾
2834	55	.1003	.1004	.0100	1,900	190,000	2,145	214,500	.20	2.0	.075×.075=.0056	44.0	do	Inside end	35½
2835	56	.0992	.0998	.0099	1,534	155,000	1,770	178,790	......	......	.081×.081=.0066	33.3	do	Outside end	26¾
2836	57	.1002	.1002	.0100	1,750	175,000	2,014	201,400	.15	1.5	.075×.075=.0056	44.0	do	Inside end	36
2837	58	.1033	.1013	.0104	1,924	185,000	2,132	205,000	.19	1.9	.082×.082=.0067	35.6	do	Outside end	33⅛
2838	59	.1002	.1006	.0100	1,800	180,000	2,081	208,100	.07	0.7	.078×.078=.0061	39.0	do	Inside end	35¾
2839	60	.1004	.1024	.0102	1,938	190,000	2,194	215,000	.30	3.0	.074×.074=.0055	46.1	do*	Outside end	32¾
2840	61	.1016	.1009	.0102	1,734	170,000	2,040	200,000	.19	1.9	.082×.082=.0067	34.3	do	100 feet from outside end	41
2841	62	.0998	.1006	.0100	1,650	165,000	1,892	189,200	.05	0.5	.083×.083=.0069	31.0	do	Outside end	27
2842	63	.1023	.1006	.0103	1,803	175,000	2,054	199,420	.28	2.8	.078×.078=.0061	40.8	do*	Inside end	37
2843	64	.1031	.1018	.0105	1,942	185,000	2,135	203,330	.28	2.8	.075×.075=.0056	46.7	do*	Outside end	35¼
2844	65	.0996	.0998	.0099	1,931	195,000	2,292	231,520	.18	1.8	.080×.080=.0064	35.4	do	Inside end	31
2845	66	.1009	.1014	.0102	1,938	190,000	2,193	215,000	.27	2.7	.078×.078=.0061	40.2	do	Outside end	33½
2846	67	.0996	.0991	.0099	1,733	175,000	1,988	200,810	.17	1.7	.078×.078=.0061	38.4	do	100 feet from outside end	46¼
2847	68	.1000	.1006	.0100	2,000	200,000	2,200	220,000	.15	1.5	.075×.075=.0056	44.0	do	Inside end	39
2848	69	.1012	.1005	.0102	1,887	185,000	2,066	202,550	.15	1.5	.075×.075=.0056	45.1	do	Outside end	34¾
2849	70	.0996	.0997	.0099	1,832	185,000	2,110	213,130	.11	1.1	.078×.078=.0061	38.4	do	Inside end	27
2850	71	.1007	.1002	.0100	1,900	190,000	2,187	218,700	.27	2.7	.074×.074=.0055	45.0	do*	Outside end	39¼
2851	72	.0992	.0995	.0099	1,881	190,000	2,170	219,190	.17	1.7	.075×.075=.0056	43.4	do	Inside end	27¾
2852	73	.1006	.0996	.0100	1,950	195,000	2,146	214,600	.07	0.7	.076×.076=.0058	42.0	do	Outside end	26¼
2853	74	.1006	.1005	.0101	2,020	200,000	2,287	226,440	.20	2.0	.080×.080=.0064	36.6	do	100 feet from outside end	44
2854	75	.1002	.0997	.0100	2,000	200,090	2,322	232,200	.20	2.0	.080×.080=.0064	36.0	do	Inside end	29
2855	76	.1002	.0988	.0099	1,881	190,000	2,030	205,000	.14	1.4	.078×.078=.0061	38.4	do	Outside end	26½
2856	77	.0997	.0998	.0099	1,881	190,000	2,150	217,170	.21	2.1	.078×.078=.0061	38.4	do	Inside end	26
2857	78	.1006	.1003	.0100	2,000	200,000	2,288	228,800	.31	3.1	.078×.078=.0061	39.0	do*	100 feet from outside end	51¾
2858	79	.0996	.0996	.0099	2,079	210,000	2,299	232,220	.20	2.0	.075×.075=.0056	43.4	do	Inside end	68¾

2859	80	.0996	.0977	.0099	1,980	200,000	2,178	220,000	.25	2.5	.077×.077=.0059	40.4	....do............	100 feet from outside end ...	73¾
2860	81	.0994	.1002	.0099	1,881	190,000	2,125	214,650	.26	2.6	.076×.076=.0058	41.4	....do*...........	Inside end................	32¼
2861	82	.1019	.1016	.0103	2,008	195,000	2,317	225,000	.10	1.0	.080×.080=.0064	37.9	....do............	Outside end..............	72
2862	83	.1004	.0997	.0100	2,000	200,000	2,195	219,500	.10	1.0	.078×.078=.0061	39.0	....do............	Inside end................	72
2863	84	.0994	.0996	.0099	1,881	190,000	2,070	209,090	.09	0.9	.076×.076=.0058	41.4	....do............	Outside end..............	69¼
2864	85	.1003	.0997	.0100	2,000	200,000	2,290	229,000	.12	1.2	.077×.077=.0059	41.0	....do............	Near middle...............	74½

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* Fractured inside the gauged section.

ELECTRICALLY WELDED STEEL WIRES, ″.10 SQUARE WIRE.

Oil-tempered coils 6–3, 6–2, and 6–1.

Tinned wires from coil No. 4, and from coil of tinned wire from first lot of samples received from the Washburn and Moen Manufacturing Company.

One sample of each has burr, due to the process of welding, left on the wire intact; other specimens have the burr filed off flush with the surface of the wire.

Experiments upon different methods of treating the welds. Welds not described as having been quenched with water or oil, which was done while the specimens were in the welding machine, were allowed to cool rapidly in the copper clamps of the welding machine.

No. 2635.

FROM OIL-TEMPERED COIL 6–3.

Welding burr removed.
Sectional area, ″.1002 × ″.1000 = .010 square inch.
Gauged length symmetrical with the weld, 10″.

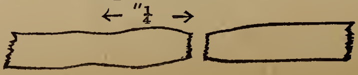
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
100	10,000	.00037	.00037	....	....	
150	15,000	.00057	.00020	....	....	
200	20,000	.00075	.00018	....	....	
250	25,000	.00094	.00019	....	....	
300	30,000	.00110	.00016	....	....	
350	35,000	.00130	.00020	....	....	
400	40,000	.00145	.00015	0.	....	
450	45,000	.00166	.00021	....	....	
500	50,000	.00180	.00014	....	....	
550	55,000	.00196	.00016	....	....	
600	60,000	.00212	.00016	....	....	
650	65,000	.00230	.00018	....	....	
700	70,000	.00246	.00016	....	....	
750	75,000	.00264	.00018	....	....	
800	80,000	.00281	.00017	0.	....	
850	85,000	.00301	.00020	....	....	
900	90,000	.00316	.00015	....	....	
950	95,000	.00333	.00017	....	....	
1,000	100,000	.00351	.00018	....	....	
1,050	105,000	.00370	.00019	....	....	
1,100	110,000	.00390	.00020	....	....	
1,150	115,000	.00413	.00023	....	....	Elastic limit.
1,200	120,000	.00438	.00025	.00005	.00005	
1,250	125,000	.00465	.00027	....	....	
1,300	130,000	.00490	.00025	....	....	
1,350	135,000	.00516	.00026	....	....	
1,400	140,000	.00548	.00032	.00054	.00049	
1,450	145,000	.00611	.00063	....	....	
1,480	148,000	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	148,000
Elastic limit per square inch of original section	do...	115,000
Elongation per inch under strain at elastic limit	inch..	0.00413
Reduction in area after rupture, per centum of original section		31.0
Position of rupture		near the weld
Character of broken surface		fine silky

The exact locality of the weld was not apparent.

One-fourth inch from the place of rupture, on the opposite end of the weld it is taken to be, there was a reduced section; midway between this reduced section and point of rupture the metal did not appear to have been drawn down during the test.



No. 2636.

FROM OIL-TEMPERED COIL 6–3.

This sample had the burr left on it as received from the Electric Welding Company.

The burr was ″.155 × ″.155 in cross-section, and about ″.10 long.

The wire showed evidence of having been heated, as judged of by the changed color on the surface; distances on each side of the weld, ″.20 and ″.30 respectively. These distances mark the limits of the blued sections; beyond this the metal was straw colored, the limits of which were indefinite.

This wire was tested with the burr remaining intact.

Sectional area of wire, ″.1002 × ″.1000 = .010 square inch.

Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
100	10,000	.00030	.00030	....	....	
150	15,000	.00050	.00020	....	....	
200	20,000	.00069	.00019	....	....	
250	25,000	.00084	.00015	....	....	
300	30,000	.00103	.00019	....	....	
350	35,000	.00123	.00020	....	....	
400	40,000	.00138	.00015	....	....	
450	45,000	.00155	.00017	....	....	
500	50,000	.00170	.00015	....	....	
550	55,000	.00188	.00018	....	....	
600	60,000	.00204	.00016	....	....	
650	65,000	.00220	.00016	....	....	
700	70,000	.00238	.00018	....	....	
750	75,000	.00255	.00017	....	....	
800	80,000	.00271	.00016	.00003	.00003	
850	85,000	.00290	.00019	....	....	
900	90,000	.00305	.00015	....	....	
950	95,000	.00325	.00020	....	....	
1,000	100,000	.00344	.00019	....	....	
1,050	105,000	.00362	.00018	....	....	
1,100	110,000	.00384	.00022	....	....	
1,150	115,000	.00402	.00018	....	....	
1,200	120,000	.00422	.00020	.00011	.00008	
1,250	125,000	.00450	.00028	....	....	
1,300	130,000	.00469	.00019	....	....	
1,350	135,000	.00492	.00023	....	....	Elastic limit.
1,364	136,400	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds.. 136,400
Elastic limit per square inch of original section .... do.... 136,400
Position of rupture .... in the burr, ″.05 from the middle
Character of broken surface .... fine granular

Fracture occurred without local contraction of the wire.

Area at place of rupture, ″.108 × ″.106 = .0114 square inch.

No. 2637.

OIL-TEMPERED WIRE FROM COIL 6–2.

Welding burr removed.
Sectional area, ″.0995 × ″.0997 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
99	10,000	.00025	.00025	....	....	
148	15,000	.00045	.00020	....	....	
198	20,000	.00063	.00018	....	....	
247	25,000	.00081	.00018	....	....	
297	30,000	.00097	.00016	....	....	
346	35,000	.00113	.00016	....	....	
396	40,000	.00130	.00017	....	....	
445	45,000	.00150	.00020	....	....	
495	50,000	.00164	.00014	....	....	
544	55,000	.00181	.00017	....	....	
594	60,000	.00198	.00017	....	....	
643	65,000	.00216	.00018	....	....	
693	70,000	.00233	.00017	....	....	
742	75,000	.00248	.00015	....	....	
792	80,000	.00267	.00019	....	....	
841	85,000	.00290	.00023	....	....	
891	90,000	.00305	.00015	....	....	
940	95,000	.00319	.00014	....	....	
990	100,000	.00339	.00020	....	....	
1,039	105,000	.00361	.00022	....	....	Elastic limit.
1,089	110,000	.00390	.00029	....	....	
1.138	115,000	.00415	.00025	....	....	
1,155	116,670	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	116,670
Elastic limit per square inch of original section .... do...	105,000
Elongation per inch under strain at elastic limit .... inch..	0.00361
Position of rupture	in vicinity of the weld
Character of broken surface	fine granular

Broke square across wire. Local contraction inappreciable.

No. 2638.

OIL-TEMPERED WIRE FROM COIL 6-2.

Welding burr not dressed off.
Sectional area of burr, ″.155 × ″.165 =.026 square inch.
Sectional area of wire, ″.0995 × ″.0997=0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
99	10,000	.00030	.00030	....	....	
148	15,000	.00050	.00020	....	....	
198	20,000	.00069	.00019	....	....	
247	25,000	.00087	.00018	....	....	
297	30,000	.00103	.00016	....	....	
346	35,000	.00122	.00019	....	....	
396	40,000	.00138	.00016	....	....	
445	45,000	.00153	.00015	....	....	
495	50,000	.00169	.00016	....	....	
544	55,000	.00185	.00016	....	....	
594	60,000	.00202	.00017	....	....	
643	65,000	.00220	.00018	....	....	
693	70,000	.00236	.00016	....	....	
742	75,000	.00252	.00016	....	....	
792	80,000	.00271	.00019	....	....	
841	85,000	.00291	.00020	....	....	
891	90,000	.00305	.00014	....	....	
940	95,000	.00323	.00018	....	....	
990	100,000	.00341	.00018	....	....	
1,039	105,000	.00361	.00020	....	....	
1,089	110,000	.00382	.00021	....	....	Elastic limit.
1,138	115,000	.00411	.00029	....	....	
1,188	120,000	.00441	.00030	....	....	
1,237	125,000	.00463	.00022	....	....	
1,287	130,000	.00494	.00031	....	....	
1,336	135,000	.00529	.00035	....	....	
1,386	140,000	.00568	.00039	....	....	
1,435	145,000	.00621	.00053	....	....	
1,463	147,780	....	....	....	....	Tensile strenth.

General summary.

Tensile strength per square inch of original section	pounds..	147,780
Elastic limit per square inch of original section	do...	110,000
Elongation per inch under strain at elastic limit	inch..	0.00382
Position of rupture		at weld, at place of maximum dimensions
Character of broken surface		dull granular, serrated edges

There was a slight drawing down in area close to the welding burr, reducing the diameter ″.001 to ″.002. The close proximity of this reduced section to the burr made it inaccessible to the points of the micrometer for exact measurement.

No. 2639.

FROM OIL-TEMPERED COIL 6–1.

Welding burr removed.
Sectional area, ″.1000 × ″.1000=.01 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	.00023	.00023	....	....	
150	15, 000	.00043	.00020	....	....	
200	20, 000	.00063	.00020	....	....	
250	25, 000	.00079	.00016	....	....	
300	30, 000	.00094	.00015	....	....	
350	35, 000	.00113	.00019	....	....	
400	40, 000	.00131	.00018	....	....	
450	45, 000	.00146	.00015	....	....	
500	50, 000	.00162	.00016	....	....	
550	55, 000	.00182	.00020	....	....	
600	60, 000	.00201	.00019	....	....	
650	65, 000	.00215	.00014	....	....	
700	70, 000	.00236	.00021	....	....	
750	75, 000	.00251	.00015	....	....	
800	80, 000	.00269	.00018	....	....	
850	85, 000	.00293	.00024	....	....	
900	90, 000	.00307	.00014	....	....	
950	95, 000	.00329	.00022	....	....	
1, 000	100, 000	.00349	.00020	....	....	Elastic limit.
1, 050	105, 000	.00379	.00030	....	....	
1, 098	109, 800	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section......................pounds.. 109, 800
Elastic limit per square inch of original section...................... do... 100, 000
Elongation per inch under strain at elastic limit......................inch.. 0. 00349
Position of rupture......................in the vicinity of the weld
Character of broken surface......................fine granular

Local contraction hardly appreciable.

No. 2640.

FROM OIL-TEMPERED COIL 6–1.

Welding-burr not removed.
Sectional area of burr, ″.140 × ″.145 = .020 square inch.
Sectional area of wire, ″.1000 × ″.1000 = .01 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	. 00028	. 00028			
150	15, 000	. 00048	. 00020			
200	20, 000	. 00064	. 00016			
250	25, 000	. 00082	. 00018			
300	30, 000	. 00099	. 00017			
350	35, 000	. 00114	. 00015			
400	40, 000	. 00130	. 00016			
450	45, 000	. 00145	. 00015			
500	50, 000	. 00164	. 00019			
550	55, 000	. 00182	. 00018			
600	60, 000	. 00200	. 00018			
650	65, 000	. 00217	. 00017			
700	70, 000	. 00233	. 00016			
750	75, 000	. 00251	. 00018			
800	80, 000	. 00270	. 00019	0.		
850	85, 000	. 00290	. 00020			
900	90, 000	. 00304	. 00014			
950	95, 000	. 00322	. 00018			
1, 000	100, 000	. 00340	. 00018			
1, 050	105, 000	. 00360	. 00020			
1, 100	110, 000	. 00382	. 00022			
1, 150	115, 000	. 00409	. 00027			
1, 200	120, 000	. 00430	. 00021			
1, 230	123, 000					Elastic limit. Tensile strength.

General summary.

Tensile strength per square inch of original section........................pounds.. 123, 000
Elastic limit per square inch of original section........................do... 123, 000
Position of rupture........................at the burr, ″.05 from the middle
Character of broken surface........................fine granular

Area at point of rupture, ″.105 × ″.105 = .011 square inch.

No. 2641.

FROM TINNED COIL No. 4.

Welding burr removed.
Sectional area, ″.1010 × ″.1008=.0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5, 000	0.	0.	0.	0.	Initial load.
102	10, 000	.00029	.00029	....	....	
153	15, 000	.00053	.00024	....	....	
204	20, 000	.00073	.00020	....	....	
255	25, 000	.00087	.00014	....	....	
306	30, 000	.00108	.00021	....	....	
357	35, 000	.00124	.00016	....	....	
408	40, 000	.00143	.00019	....	....	
459	45, 000	.00161	.00018	....	....	
510	50, 000	.00179	.00018	....	....	
561	55, 000	.00197	.00018	....	....	
612	60, 000	.00217	.00020	....	....	
663	65, 000	.00236	.00019	....	....	
714	70, 000	.00256	.00020	....	....	
765	75, 000	.00278	.00022	....	....	
816	80, 000	.00298	.00020	.00005	.00005	Elastic limit.
867	85, 000	.05343	.00045	....	....	
918	90, 000	.00368	.00025	....	....	
969	95, 000	.00403	.00035	....	....	
1, 020	100, 000	.00433	.00030	....	....	
1, 054	103, 330	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds.. 103, 330
Elastic limit per square inch of original section	do... 80, 000
Elongation per inch under strain at elastic limit	inch.. 0. 00298
Position of rupture	in the vicinity of the weld
Character of broken surface	dull, fine granular

In the vicinity of the fracture the wire contracted in diameter ″.002±.

No. 2642.

FROM TINNED COIL NO. 4.

Welding burr not removed.
Sectional area of burr, ″.147 × ″.153=.021 square inch.
Sectional area of wire, ″.1010 × ″1008=″.0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch*	
51	5,000	0.	0.	0.	0.	Initial load.
102	10,000	.00026	.00026			
153	15,000	.00046	.00020			
204	20,000	.00065	.00019			
255	25,000	.00080	.00015			
306	30,000	.00100	.00020			
357	35,000	.00115	.00015			
408	40,000	.00134	.00019			
459	45,000	.00150	.00016			
510	50,000	.00166	.00016			
561	55,000	.00187	.00021			
612	60,000	.00204	.00017			
663	65,000	.00224	.00020			
714	70,000	.00243	.00019			
765	75,000	.00262	.00019			
816	80,000	.00284	.00022			
867	85,000	.00306	.00022			
918	90,000	.00326	.00020			
969	95,000	.00345	.00019			
1,020	100,000	.00368	.00023			Elastic limit.
1,071	105,000	.00394	.00026			
1,122	110,000	.00428	.00034			
1,173	115,000	.00456	.00028			
1,224	120,000	.00488	.00032			
1,275	125,000	.00537	.00049			
1,326	130,000	.00592	.00055			
1,377	135,000	.00658	.00066			
1,428	140,000	.00754	.00096			
1,470	144,120					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	144,120
Elastic limit per square inch of original section	do	100,000
Elongation per inch under strain at elastic limit	inch	0.00368
Reduction in area after rupture, per centum of original section		20.6
Position of rupture		″.08 from the middle of the burr
Character of broken surface		fine silky

Area at fracture, ″.090 × ″.090=.0081 square inch.
Contraction, 20.6 per cent.

On the opposite side of the burr from the fracture, the wire was drawn down ″.002 in diameter over a section of the wire about $\frac{1}{16}$ inch long.

No. 2643.

FROM COIL OF TINNED WIRE.

For original tests of wire from this coil see experiments Nos. 2553 to 2556, inclusive.

Welding burr removed.

Sectional area, ″.1003 × ″.1013=.01 square inch.

Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	.00032	.00032	....	....	
150	15, 000	.00053	.00021	....	....	
200	20, 000	.00070	.00017	....	....	
250	25, 000	.00089	.00019	....	....	
300	30, 000	.00104	.00015	....	....	
350	35, 000	.00122	.00018	....	....	
400	40, 000	.00142	.00020	....	....	
450	45, 000	.00161	.00019	....	....	
500	50, 000	.00181	.00020	....	....	
550	55, 000	.00200	.00019	....	....	
600	60, 000	.00220	.00020	....	....	
650	65, 000	.00240	.00020	....	....	
700	70, 000	.00261	.00021	....	....	
750	75, 000	.00282	.00021	....	....	
800	80, 000	.00304	.00022	.00013	.00013	Elastic limit.
850	85, 000	.00328	.00024	....	....	
900	90, 000	.00354	.00026	....	....	
950	95, 000	.00382	.00028	....	....	
1, 000	100, 000	.00410	.00028	....	....	
1, 050	105, 000	.00448	.00038	....	....	
1, 100	110, 000	.00478	.00030	....	....	
1, 150	115, 000	.00529	.00051	....	....	
1, 192	119, 200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds.. 119, 200
Elastic limit per square inch of original section ....do... 80, 000
Elongation per inch under strain at elastic limit ....inch.. 0. 00304
Position of rupture ....at or near the weld
Character of broken surface, dull, smooth surface, minute granulation. The wire, ″.20 each side of the fracture, was reduced in diameter ″.002.

No. 2644.

FROM SAME COIL AS No. 2643.

Welding burr not removed.
Sectional area of burr, ″.172 × ″.172=.0296 square inch.
Sectional area of wire, ″.1003 × ″.1013=″.01.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
100	10,000	.00026	.00026	....	....	
150	10,000	.00046	.00020	....	....	
200	20,000	.00066	.00020	....	....	
250	25,000	.00084	.00018	....	....	
300	30,000	.00102	.00018	....	....	
350	35,000	.00122	.00020	....	....	
400	40,000	.00137	.00015	....	....	
450	45,000	.00160	.00023	....	....	
500	50,000	.00179	.00019	....	....	
550	55,000	.00197	.00018	....	....	
600	60,000	.00220	.00023	....	....	
650	65,000	.00239	.00019	....	....	
700	70,000	.00259	.00020	....	....	
750	75,000	.00281	.00022	....	....	
800	80,000	.00301	.00020	.00015	.00015	
850	85,000	.00325	.00024	....	....	
900	90,000	.00345	.00020	....	....	
950	95,000	.00369	.00024	....	....	
1,000	100,000	.00392	.00023	....	....	Elastic limit.
1,050	105,000	.00421	.00029	....	....	
1,100	110,000	.00444	.00023	....	....	
1,150	115,000	.00480	.00036	....	....	
1,200	120,000	.00511	.00031	....	....	
1,250	125,000	.00553	.00042	....	....	
1,300	130,000	.00594	.00041	....	....	
1,350	135,000	.00654	.00060	....	....	
1,400	140,980	.00743	.00089	....	....	
1,450	145,000	.00891	.00048	....	....	
1,485	148,500	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	148,500
Elastic limit per square inch of original section	do	100,000
Elongation per inch, under strain at elastic limit	inch	0.00392
Reduction in area after rupture, per centum of original section		24.0
Position of rupture		″.10 from middle of burr
Character of broken surface		silky, interspersed with fine granulations

On the opposite side of the burr from the fracture the wire was reduced in diameter about ″.002 over a length of ″.10.

No. 2648.

FROM OIL-TEMPERED COIL 6–3.

Quenched with oil at time of welding.
Welding burr ground off.
Sectional area, ″.1002 × ″.1000 = .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
100	10,000	.00028	.00028	....	....	
150	15,000	.00047	.00019	....	....	
200	20,000	.00066	.00019	....	....	
250	25,000	.00082	.00016	....	....	
300	30,000	.00101	.00019	....	....	
350	35,000	.00116	.00015	....	....	
400	40,000	.00132	.00016	....	....	
450	45,000	.00148	.00016	....	....	
500	50,000	.00163	.00015	....	....	
550	55,000	.00181	.00018	....	....	
600	60,000	.00197	.00016	....	....	
650	65,000	.00215	.00018	....	....	
685	68,500	....	....	....	....	Tensile strength.

Fractured at the weld.
Appearance, fine granular; a part of the surface dull luster.
No appreciable contraction of area.

No. 2649.

FROM OIL-TEMPERED COIL 6-3.

Quenched with oil at time of welding.
Welding burr ground off.
Sectional area, ″.1002 × ″.1000 =.010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5, 000	0.	0.	0.	0.	Initial load.
100	10, 000	.00037	.00037	....	....	
150	15, 000	.00054	.00017	....	....	
200	20, 000	.00074	.00020	....	....	
250	25, 000	.00089	.00015	....	....	
300	30, 000	.00108	.00019	....	....	
350	35, 000	.00126	.00018	....	....	
400	40, 000	.00140	.00014	....	....	
450	45, 000	.00158	.00018	....	....	
500	50, 000	.00175	.00017	....	....	
550	55, 000	.00192	.00017	....	....	
600	60, 000	.00207	.00015	....	....	
650	65, 000	.00227	.00020	....	....	
700	70, 000	.00243	.00016	....	....	
742	74, 200	....	....	....	....	Tensile strength.

Fractured at the weld.
Appearance, fine granular; a part of the surface of dull luster.
No appreciable contraction of area.

No. 2650.

FROM OIL-TEMPERED COIL 6–3.

Quenched with water at time of welding.
Welding burr ground off.
Sectional area, ″.1002 × ″.1000 =.010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
190	19,000	....	....	....	....	Tensile strength.

Fractured at the weld.
Appearance, fine, granular, a part of the surface of dull luster.
No appreciable contraction of area.

No. 2651.

FROM OIL-TEMPERED COIL 6–2.

Quenched with oil at time of welding.
Welding burr ground off.
Sectional area, ″.0995 × ″.0997 =.0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
99	10,000	.00027	.00027	....	....	
148	15,000	.00043	.00016	....	....	
198	20,000	.00060	.00017	....	....	
247	25,000	.00079	.00019	....	....	
297	30,000	.00099	.00020	....	....	
346	35,000	.00112	.00013	....	....	
396	40,000	.00132	00020	....	....	Tensile strength.

Fractured at the weld.
Appearance, fine granular; a part of the surface of dull luster.
No appreciable contraction of area.

No. 2652.

FROM OIL-TEMPERED COIL 6–2.

Quenched with oil at time of welding.
Welding burr ground off.
Sectional area, ″.0995 × ″.0997=.0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
99	10,000	.00034	.00034	....	....	
148	15,000	.00052	.00018	....	....	
198	20,000	.00072	.00020	....	....	
247	25,000	.00089	.00017	....	....	
297	30,000	.00108	.00019	....	....	
346	35,000	.00128	.00020	....	....	
396	40,000	.00145	.00017	....	....	
398	42,000	....	....	....	....	Tensile strength.

Fractured at the weld. Appearance, coarse granular.
No appreciable contraction of area.

No. 2653.

FROM OIL-TEMPERED COIL 6–2.

Quenched with water at time of welding.
Welding burr ground off.
Sectional area, ″.0995 × ″.0997=.0099 square inch.

Tensile strength, 256 pounds=25,860 pounds per square inch.
Fractured at the weld.
Appearance, fine granular; a part of the surface of dull luster.
No appreciable contraction of area.

No. 2654.

FROM OIL-TEMPERED COIL 6–1.

Quenched with oil at time of welding.

Welding burr, ″.155 × ″.159 left on the wire.

Sectional area, ″.1000 × ″.1000=.010 square inch.

Tensile strength, 938 pounds = 93,800 pounds per square inch.

Fractured at the weld, being also the place of maximum diameter of the burr.

Appearance, dull luster to the surface, with fine granulation interspersed.

No. 2655.

FROM OIL-TEMPERED COIL 6–1.

Quenched with water at time of welding.

Welding burr, ″.180 × ″.180 left on the wire.

Sectional area, ″.1000 × ″.1000 = .010 square inch.

Tensile strength, 598 pounds = 59,800 pounds per square inch.

Fractured ″.03 from the weld at the middle of the burr.

The dimensions at the place of fracture were ″.112 × ″.112.

Appearance of fracture, fine granular.

No. 2656.

FROM TINNED COIL NO. 4.

Quenched with oil at time of welding.

Welding burr, ″.170 × ″.170 left on the wire.

Sectional area of wire, ″.1010 × ″.1008 = .0102 square inch.

Tensile strength, 1,458 pounds = 142,940 pounds per square inch.

Fractured ″.12 from the weld. Appearance, silky at edges; fine granular center.

Area at fractures, ″.091 × ″.091 = .0083 square inch.

Contraction, 18.6 per cent.

On the opposite side of the welding burr from the fracture the metal was drawn down about ″.002 diameter over a length of ″.05.

No. 2657.

From Tinned Coil No. 4.

Quenched with oil at time of welding.
Welding burr, ″.165 × ″.160 left on the wire.
Sectional area, ″.1010 × ″.1008 =.0102 square inch.
Tensile strength, 1,194 pounds = 117,060 pounds per square inch.
Fractured in the burr ″.03 from the weld. Appearance, fine granular.
Dimensions at fracture, ″.110 × ″.110.

No. 2658.

From Coil of Tinned Wire.

Original tests Nos. 2553 to 2556 inclusive.
Quenched with oil at time of welding.
Welding burr ground off.
Sectional area, ″.1003 × ″.1013 =.010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
100	10,000	.00029	.00029	....	....	
150	15,000	.00042	.00013	....	....	
200	20,000	.00067	.00025	....	....	
250	25,000	.00082	.00015	....	....	
300	30,000	.00102	.00020	....	....	
342	34,200	....	....	....	....	Tensile strength.

Fractured at the weld; dull luster to fractured surface, which was smooth except at the center of the wire, where there was a granular spot ″.03 diameter.
No appreciable contraction.

No. 2659.

From same coil of tinned wire as No. 2658.
Quenched with oil at time of welding.
Welding burr (″.165 × ″.165) not removed.
Sectional area of wire, ″.1003 × ″.1013 = .010 square inch.
Tensile strength 998 pounds = 99,800 pounds per square inch.
Fractured ″.04 from middle of burr. Appearance, granular.
Dimensions at place of fracture, ″.120 × ″.120.
No appreciable local contraction.

No. 2660.

From same coil of tinned wire as No. 2658.
Quenched with water at time of welding.
Welding burr ground off.
Sectional area ″.1003 × ″.1013 = ″.010 square inch.
Tensile strength 155 pounds = 15,500 pounds per square inch.
Fractured at the weld. Appearance, coarse granular.
No appreciable contraction of area.

ELECTRICALLY WELDED STEEL WIRES.

TABULATION OF TENSILE TESTS.

[Welded specimens which were allowed to cool rapidly, in the clamps of the welding machine.]

No. of test.	Kind of wire.	Mark on coil.	Condition of welding burr.	Dimensions of wire.	Sectional area.	Elastic limit.		Tensile strength.		Area at fracture.	Contraction of area.	Fractured.
						Total.	Per square inch.	Total.	Per square inch.			
				Inch. Inch.	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*In. In. Sq. in.*	*Per ct.*	
2635	Oil tempered	6-3	Removed	.1002×.1000	.0100	1,150	115,000	1,480	148,000	.083×.083=.0069	31.0	Near the weld, fine silky.
2636	do	6-3	Not removed	.1002×.1000	.0100	1,364	136,400	1,364	136,400			In the burr, fine granular.
2637	do	6-2	Removed	.0995×.0997	.0099	1,039	105,000	1,155	116,670			In vicinity of weld, fine granular.
2638	do	6-2	Not removed	.0995×.0997	.0099	1,089	110,000	1,463	147,780			In the burr, dull granular serrated.
2639	do	6-1	Removed	.1000×.1000	.0100	1,000	100,000	1,098	109,800			In vicinity of weld, fine granular.
2640	do	6-1	Not removed	.1000×.1000	.0100	1,230	123,000	1,230	123,000			In the burr, fine granulation.
2641	Tinned	4	Removed	.1010×.1008	.0102	816	80,000	1,054	103,330			In vicinity of weld, dull fine granular.
2642	do	4	Not removed	.1010×.1008	.0102	1,020	100,000	1,470	144,120	.090×.090=.0081	20.6	″.08 from the middle of the burr, fine silky.
2643	do		Removed	.1003×.1013	.0100	800	80,000	1.192	119,200			At or near the weld, dull smooth surface, minute granulation.
2644	do		Not removed	.1003×.1013	.0100	1,000	100,000	1,485	148,500	.087×.087=.0076	24.0	″.10 from middle burr, silky, interspersed with fine granulation.

ELECTRICALLY WELDED STEEL WIRES—Continued.

TABULATION OF TENSILE TESTS—Continued.

[Welded specimens which were quenched with water or oil after welding and while in the clamps of the welding machine.]

No. of test.	Kind of wire.	Mark on coil.	Condition of welding burr.	Dimensions of wire.	Sectional area.	Tensile strength.		Fractured.	Treatment at time of welding.
						Total	Per square inch.		
				Inch. Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*		
2648	Oil tempered	6—3	Removed	.1002×.1000	.0100	685	68,500	At weld, fine granular; dull luster	Quenched with oil.
2649	....do	6—3	....do	.1002×.1000	.0100	742	74,200	....do	Do.
2650	....do	6—3	....do	.1002×.1000	.0100	190	19,000	....do	Quenched with water.
2651	....do	6—2	....do	.0995×.0997	.0099	396	40,000	....do	Quenched with oil.
2652	....do	6—2	....do	.0995×.0997	.0099	398	42,000	At weld, coarse granular	Do.
2653	....do	6—2	....do	.0995×.0997	.0099	256	25,860	At weld, fine granular; dull luster	Quenched with water.
2654	....do	6—1	Not removed	.1000×.1000	.0100	938	93,800	....do	Quenched with oil.
2655	....do	6—1	....do	.1000×.1000	.0100	598	59,800	Middle of burr, fine granular	Quenched with water.
2656	Tinned	4	....do	.1010×.1008	.0102	1,458	142,940	".12 from weld, silky edges, fine granular center.	Quenched with oil.
2657	....do	4	....do	.1010×.1008	.0102	1,194	117,060	In the burr ".03 from the weld, fine granular.	Do.
2658	....do		Removed	.1003×.1013	.0100	342	34,200	At weld, dull luster; granular spot	Do.
2659	....do		Not removed	.1003×.1013	.0100	998	99,800	".04 from middle of burr, granular	Do.
2660	....do		Removed	.1003×.1013	.0100	155	15,500	At weld, coarse granular	Quenched with water.

TENSILE TESTS OF ELECTRICALLY WELDED AND PLAIN ″.10 AND ″.15 SQUARE STEEL WIRE.

[Welded at the works of the Thompson Electric Welding Company, Lynn, Mass., June 20, 1889, upon the welding machine constructed by that company for the Watervliet Arsenal, West Troy, N. Y.]

Samples of ″.10 square wire were taken from Washburn and Moen's sample coil, marked 6—3. Samples of ″.15 square wire were taken from a refuse end of tinned wire on hand at Watertown Arsenal, from the lot of wire used in the construction of 10-inch Woodbridge rifle.

Welding burrs removed before testing by tension.

No. of test.	Kind of wire.	Size of welding burr.	Size of wire.	Sectional area of wire.	Tensile strength.			Fractured.	Remarks.
					Total.	Per square inch.	Plain wire.		
		Inch. Inch.	*Inch. Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*		
2905	Tinned	.212×.220	.1490×.1494	.0223	2,690	120,630	70.0	At the weld	Rapid cooling in the clamps.
2906	....do	.231×.232	.1490×.1494	.0223	2,360	105,830	61.4	....do	Medium rapid cooling in the clamps.
2907	....do	.248×.250	.1490×.1494	.0223	2,140	95,960	55.7	....do	Slow cooling in the clamps.
2908	Oil tempered	.158×.159	.1000×.0998	.0100	1,068	106,800	47.6	....do	Rapid cooling in the clamps.
2909	....do	.174×.174	.1000×.0998	.0100	975	97,500	43.4	....do	Slow cooling in the clamps.
2910	....do	.157×.158	.1000×.0998	.0100	948	94,800	42.2	....do	Do.
2911	....do	.154×.155	.1000×.0998	.0100	610	61,000	27.2	....do	Slow cooling, and welded at lowest temperature.
							Mean.		
2912	Tinned	Plain	.1490×.1494	.0223	3,860	173,090	172,305		
2913	....do	....do	.1490×.1494	.0223	3,825	171,520			
2914	Oil tempered	....do	.1000×.0998	.0100	2,240	224,000	224,400		
2915	....do	....do	.1000×.0998	.0100	2,248	224,800			

ELECTRICALLY-WELDED STEEL WIRE.

Specimens of ″.15 square, tinned, steel wire, from metal used in the construction of 10-inch Woodbridge rifle.

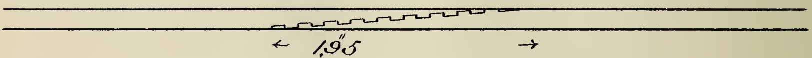
No. of test.	Marks.	Sectional area at weld.		Tensile strength.	
		Dimensions.	Area.	Total.	Per square inch on wire.
		Inch. Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*
2460	A	.1478×.1440	.0213	2, 580	115, 180
2461	B	.1484×.1484	.0220	2, 545	113, 620
2462	C	.1484×.1496	.0222	2, 574	114, 910
2463	D	.1484×.1444	.0214	2, 543	113, 530
2464	E	.1468×.1473	.0216	2, 681	119, 690
2465	F	.1470×.1483	.0218	2, 340	104, 460
2466	G	.1503×.1491	.0224	2, 610	116, 520
2467	H	.1483×.1476	.0219	2, 577	115, 040
2468	I	.1466×.1453	.0213	2, 508	111, 960
2469	J	.1456×.1474	.0215	2, 318	103, 480
2470	K	.1476×.1481	.0219	2, 552	113, 930
2471	L	.1506×.1496	.0225	2, 630	117, 410
2472	M	.1470×.1460	.0215	2, 548	113, 750
2473	N	.1440×.1461	.0215	2, 498	111, 520
2474	O	.1446×.1486	.0215	2, 336	104, 290
2475	P	.1465×.1475	.0216	1, 435	64, 060
2476	Q	.1460×.1464	.0214	2, 447	109, 240
2477	R	.1461×.1464	.0214	950	42, 410
2478	S	.1463×.1463	.0214	2, 574	114, 910
2479	T	.1480×.1448	.0214	2, 632	117, 500
2480	U	.1457×.1464	.0213	2, 550	113, 840
2481	V	.1473×.1471	.0217	2, 470	110, 270
2482	W	.1466×.1482	.0217	2, 495	111, 380
2483	X	.1463×.1473	.0215	2, 210	98, 660

Samples marked F, P, R, V, and X fractured square across the wire at the welds; all other samples exhibited fine silky fractures, which occurred in the vicinity of the welds, the exact location of the welds not being discernible.

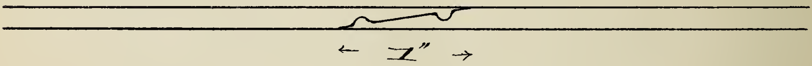
ELECTRICALLY BRAZED AND WELDED ".15 SQUARE STEEL WIRE.

Steel wire .15" square
Styles of joints

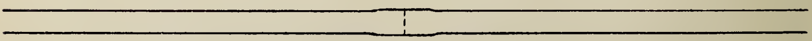
Brazed, samples A & B



Brazed, samples C & D



Electrically welded.
samples E & F



Butt weld.

No. 2081.

BRAZED JOINT A.

Sectional area of wire, ″.1495 ×″.1495 =.0223 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
112	5, 000	0.	0.	0.	0.	Initial load.
223	10, 000	.00020	.00020	....	....	
335	15, 000	.00040	.00020	....	....	
446	20, 000	.00058	.00018	....	....	
558	25, 000	.00077	.00019	....	....	
669	30, 000	.00093	.00016	....	....	
781	35, 000	.00117	.00024	....	....	
892	40, 000	.00138	.00021	....	....	
1, 004	45, 000	.00162	.00024	....	....	
1, 085	48, 650	....	....	....	....	Tensile strength.

Fractured in the scarf joint ″.55 from the end. Appearance, silky, 50 per cent.; granular next brazed joint, 50 per cent. No appreciable contraction of area.

No. 2082.

BRAZED JOINT B.

Sectional area of wire, .0223 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
112	5, 000	0.	0.	0.	0.	Initial load.
223	10, 000	.00020	.00020	....	....	
335	15, 000	.00045	.00025	....	....	
446	20, 000	.00067	.00022	....	....	
558	25, 000	.00087	.00020	....	....	
669	30, 000	.00108	.00021	....	....	
781	35, 000	.00130	.00022	....	....	
865	38, 790	....	....	....	....	Tensile strength.

Fractured in the scarf ″.60 from end. Appearance, granular each side of the bearing, and at one edge, with silky sections of metal between. The granular metal was in part of a dark-blue color.

No. 2083.

BRAZED JOINT C.

Sectional area of wire, .0223 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
112	5,000	0.	0.	0.	0.	Initial load.
223	10,000	.00012	.00012	....	....	
335	15,000	.00031	.00019	....	....	
446	20,000	.00051	.00020	....	....	
558	25,000	.00070	.00019	....	....	
669	30,000	.00089	.00019	....	....	
781	35,000	.00108	.00019	....	....	
892	40,000	.00128	.00020	....	....	
1,004	45,000	.00151	.00023	....	....	
1,116	50,000	.00169	.00018	....	....	
1,227	55,000	.00193	.00024	....	....	
1,338	60,000	.00236	.00043	....	....	
1,450	65,000	.0289	.00053	....	....	
1,480	66,370	....	....	....	....	Tensile strength.

Fractured near the end of the joint, separating along the brazing a length of 10″, then fracturing the metal of the wire with a silky appearance.

No. 2084.

BRAZED JOINT D.

Sectional area of wire, .0223 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
112	5,000	0.	0.	0.	0.	Initial load.
223	10,000	.00020	.00020	....	....	
335	15,000	.00040	.00020	....	....	
446	20,000	.00060	.00020	....	....	
558	25,000	.00080	.00020	....	....	
669	30,000	.00100	.00020	....	....	
781	35,000	.00117	.00017	....	....	
892	40,000	.00137	.00020	....	....	
920	41,250	....	....	....	....	Tensile strength.

Fractured near the end of the joint, separating along the brazing ″.10 and then fracturing the metal of the wire.

Appearance of fracture, silky, slightly granular.

There was a slight cavity in the surface of the wire on the opposite side, at that end of the joint through which cavity the fracture extended.

No. 2085.

ELECTRICALLY WELDED JOINT E.

Sectional area of wire, .0223 square inch.
Dimensions at each end of weld, ″.148 × ″.148.
Gauged length, 10″.
Finished by hammering after welding.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
112	5,000	0.	0.	0.	0.	Initial load.
223	10,000	.00020	.00020	....	....	
335	15,000	.00041	.00021	....	....	
446	20,000	.00061	.00020	....	....	
558	25,000	.00079	.00018	....	....	
669	30,000	.00097	.00018	....	....	
781	35,000	.00117	.00020	....	....	
892	40,000	.00137	.00020	....	....	
1,004	45,000	.00154	.00017	....	....	
1,116	50,000	.00177	.00023	....	....	
1,227	55,000	.00198	.00021	....	....	
1,338	60,000	.00221	.00023	....	....	Elastic limit.
1,450	65,000	.00256	.00035	....	....	
1,562	70,000	.00297	.00041	....	....	
1,673	75,000	.00352	.00055	....	....	
1,784	80,000	.00427	.00075	....	....	
1,895	85,000	.00518	.00091	....	....	
2,007	90,000	.00637	.00119	....	....	
2,119	95,000	.00860	.00223	....	....	
2,160	96,860	....	....	....	....	Tensile strength

Fractured ¾″ from middle of enlarged section of the weld.
Appearance, fine silky. Cup-shaped.
Area at fracture, ″.108 × ″.108 = .0117 square inch.
Contraction, 47.5 per cent.

No. 2086.

ELECTRICALLY WELDED JOINT F.

Sectional area of wire, .0223 square inch.
Dimensions at each end of weld, ″.146 × ″.146.
Gauged length, 10″.
Finished by hammering after welding.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
112	5, 000	0.	0.	0.	0.	Initial load.
223	10, 000	.00020	.00020	....	....	
335	15, 000	.00034	.00014	....	....	
446	20, 000	.00057	.00023	....	....	
558	25, 000	.00077	.00020	....	....	
669	30, 000	.00094	.00017	....	....	
781	35, 000	.00112	.00018	....	....	
892	40, 000	.00126	.00014	....	....	
1, 004	45, 000	.00146	.00020	....	....	
1, 116	50, 000	.00164	.00018	....	....	
1, 227	55, 000	.00184	.00020	....	....	
1, 338	60, 000	.00204	.00020	....	....	Elastic limit.
1, 450	65, 000	.00238	.00034	....	....	
1, 562	70, 000	.00408	.00170	....	....	
1, 673	75, 000	.00508	.00100	....	....	
1, 720	77, 130	....	....	....	....	Tensile strength.

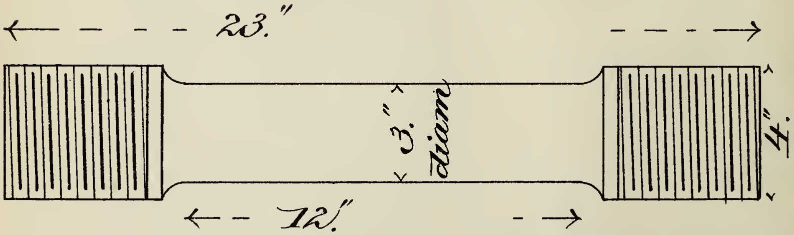
Fractured square across the wire, apparently at the weld.
Appearance, dull smooth surface, in part granular.

ALTERNATE STRAINING

OF

STEEL BARS.

Form of specimens for alternate Tensile and Compressive stresses.



H Ex 14 51 1

Five bars of Midvale steel, each about 4⅛″ diameter and 56″ long, were procured for these tests, of which number four have been tested.

The specimens were prepared with stems 3″ diameter by 12″ long, having threaded ends 4″ diameter.

They were secured for testing in adjustable fixtures, the essential feature of the fixtures being a nut threaded to hold the specimen, and having concentric convex and concave seats.

The fixtures enabled strains in the specimen to be reversed, without disturbing the position of the latter, after adjustment to receive the stresses in an axial direction.

The bars were subjected to alternate tension and compression stresses, the manner of application being set forth in the details of the individual tests.

The effect of overstraining on the elastic properties will be noted.

Smaller samples for direct tension and compression tests were taken from two bars.

COMPRESSION TEST.

No. 2757.

Specimen from a bar of Midvale steel marked $\begin{smallmatrix} S\,B_1 \\ L_3\,M \\ N_1 \end{smallmatrix}$.
Length, 7″.88.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.

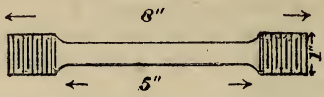
Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	0.	0.	Initial load.
4,000	5,000	.000100	.000100	....	....	
8,000	10,000	.000260	.000160	....	....	
12,000	15,000	.000420	.000160	....	....	
16,000	20,000	.000580	.000160	....	....	
20,000	25,000	.000740	.000160	....	....	
24,000	30,000	.000900	.000160	0.	....	
28,000	35,000	.001060	.000160	....	....	
32,000	40,000	.001240	.000180	0.	....	
32,800	41,000	.001260	.000020	....	....	
33,600	42,000	.001300	.000040	....	....	
34,400	43,000	.001340	.000040	....	....	
35,200	44,000	.001360	.000020	....	....	
36,000	45,000	.001400	.000040	....	....	
36,800	46,000	.001460	.000060	....	....	
37,600	47,000	.001480	.000020	....	....	
38,400	48,000	.001520	.000040	....	....	
39,200	49,000	.001540	.000020	....	....	
40,000	50,000	.001580	.000040	.000020	.000020	Elastic limit.
40,800	51,000	.001680	.000100	....	....	
41,600	52,000	.003740	.002060	....	....	
42,400	53,000	.008040	.004300	....	....	
43,200	54,000	.008720	.000680	....	....	
44,000	55,000	.009720	.001000	.007680	.007660	
52,820	66,020	....	....	....	....	Ultimate strength.

Failed by triple flexure.

TENSION TEST.

No. 2758.

Specimen from same bar as No. 2757.



Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 5".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000140	.000140	....	....	
2,500	10,000	.000340	.000200	....	....	
3,750	15,000	.000440	.000100	....	....	
5,000	20,000	.000640	.000200	....	....	
6,250	25,000	.000800	.000160	....	....	
7,500	30,000	.001000	.000200	....	....	
8,750	35,000	.001160	.000160	....	....	
10,000	40,000	.001320	.000160	....	....	
11,250	45,000	.001500	.000180	....	....	
12,500	50,000	.001660	.000160	....	....	Elastic limit.
12,750	51,000	.001760	.000100	....	....	
13,000	52,000	.009500	.007740	....	....	
13,250	53,000	.010320	.000820	....	....	
13,500	54,000	.011200	.000880	....	....	
13,750	55,000	.012240	.001040	....	....	
14,000	56,000	.013400	.001160	....	....	
14,500	58,000	.015500	.002100	....	....	
15,000	60,000	.018300	.002800	....	....	
15,500	62,000	.021200	.002900	....	....	
16,000	64,000	.023800	.002600	....	....	
16,500	66,000	.026800	.003000	....	....	
17,000	68,000	.029800	.003000	....	....	
17,500	70,000	.034000	.004200	....	....	
18,000	72,000	.038	.004	....	....	
18,500	74,000	.042	.004	....	....	
19,000	76,000	.052	.010	....	....	
19,500	78,000	.060	.008	....	....	
20,000	80,000	.072	.012	....	....	
20,500	82,000	.094	.022	....	....	
20,790	83,160	.138	.044	....	....	Tensile strength.
15,700	....	....	....	....	....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	83,160
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	0.2160
Elongation per inch under strain at elastic limit	do...	.001660
Reduction in diameter at point of rupture		.214
Reduction in area after rupture, per centum of original section		61.5
Position of rupture		2".40 from the neck
Character of broken surface		fine silky
Elongation of inch sections		".15, ".44*, ".23, ".14, ".12

TENSION TEST.

No. 2759.

Specimen from same bar as No. 2757.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 5″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000140	.000140	....	....	
2, 500	10, 000	.000340	.000200	....	....	
3, 750	15, 000	.000520	.000180	....	....	
5, 000	20, 000	.000680	.000160	....	....	
6, 250	25, 000	.000840	.000160	....	....	
7, 500	30, 000	.001040	.000200	....	....	
8, 750	35, 000	.001200	.000160	....	....	
10, 000	40, 000	.001380	.000180	0.	....	
11, 250	45, 000	.001520	.000140	....	....	
12, 500	50, 000	.001860	.000340	....	....	Elastic limit.
12, 000	48, 000	.003340	.001480	....	....	Load fell.
12, 250	49, 000	.004420	.001080	....	....	
12, 500	50, 000	.005800	.001380	....	....	
12, 750	51, 000	.007500	.001700	....	....	
13, 000	52, 000	.009800	.002300	....	....	
13, 500	54, 000	.012500	.002700	....	....	
14, 000	56, 000	.014000	.001500	....	....	
14, 500	58, 000	.014800	.000800	....	....	
15, 000	60, 000	.018200	.003400	....	....	
15, 500	62, 000	.021000	.002800	....	....	
16, 000	64, 000	.023300	.002300	....	....	
16, 500	66, 000	.026500	.003200	....	....	
17, 000	68, 000	.029800	.003300	....	....	
17, 500	70, 000	.033500	.003700	....	....	
18, 000	72, 000	.037500	.004000	....	....	
18, 500	74, 000	.043000	.005500	....	....	
19, 000	76, 000	.054	.011	....	....	
19, 500	78, 000	.060	.006	....	....	
20, 000	80, 000	.068	.008	....	....	
20, 500	82, 000	.084	.016	....	....	
20, 980	83, 920	.140	.056	....	....	Tensile strength.
16, 100	....	....	....	....	....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	83, 920
Elastic limit per square inch of original section	do...	50, 000
Elongation per inch after rupture	inch..	0. 2000
Elongation per inch under strain at elastic limit	do...	.001860
Reduction in diameter at point of rupture	do...	.204
Reduction in area after rupture, per centum of original section		59. 3
Position of rupture		1″.40 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.23, ″.41*, ″.15, ″.12, ″.09

ALTERNATE TENSILE AND COMPRESSIVE STRESSES.

No. 2760.

From same bar as No. 2757. Marks, $\overset{SB_1}{\underset{N_1}{L_3M}}$

Diameter, 3″. Sectional area, 7.068 square inches.
Gauged length, 10″.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	
7,068	1,000	.00005								
70,680	10,000	.00035		.00001						
7,068	1,000					.00003				
70,680	10,000					.00029		—.00001		
	10,000	.00035		.00002						
	10,000					.00030		—.00002		
106,020	15,000	.00052		.00002						
	15,000					.00046		—.00002		
	15,000	.00052		.00002						
	15,000					.00047		—.00002		
141,360	20,000	.00070		.00004						
	20,000					.00062		—.00002		
	20,000	.00069		.00004						
	20,000					.00063		—.00002		
176,700	25,000	.00085		.00004						
	25,000					.00079		—.00003		
	25,000	.00085		.00004						
	25,000					.00079		—.00003		
212,040	30,000	.00102		.00004						
	30,000					.00095		—.00003		
	30,000	.00102		.00005						
	30,000					.00095		—.00003		
247,380	35,000	.00120		.00005						
	35,000					.00110		—.00003		
	35,000	.00120		.00005						
	35,000					.00110		—.00003		
282,720	40,000					.00125		—.00005		

	40,000	.00137		.00005						
	40,000					.00125		—.00004		
	40,000	.00137		.00005						
318,060	45,000					.00142		—.00004		
	45,000	.00158		.00006						
	45,000					.00145		—.00004		
	45,000	.00160		.00007						
339,264	48,000					.00155		—.00004		
	48,000	.00173		.00008						
	48,000					.00155		—.00003		
	48,000	.00175		.00010						
353,400	50,000					.00168		+.00002		
	50,000	.00205		.00035						
	50,000					.00190				
	50,000					.00194	.00004	.00030	.00065	After sustaining load 8 minutes.
360,468	51,000					.00209	.00015			
	51,000					.00328	.00119			After 5 minutes.
	51,000					.00345	.00017			After 10 minutes.
	51,000					.00352	.00007			After 20 minutes.
	51,000					.00361	.00009			After 30 minutes.
360,468	51,000									Tensile load applied and immediately released.
360,468	51,000					.00365	.00004			
	51,000					.00385	.00020			After 5 minutes.
	51,000					.00393	.00008			After 10 minutes.
282,720	40,000					.00358				Load left on bar Saturday night.
166,100	23,500					.00290		.00190	.00160	Load and reading 39 hours later.
141,360	20,000					.00255				
212,040	30,000					.00275	.00020			
282,720	40,000					.00310	.00035			
318,060	45,000					.00322	.00012			Micrometer in frame loose during some of these readings.
325,128	46,000					.00326	.00004			
332,196	47,000					.00331	.00005			
339,264	48,000					.00334	.00003			
346,332	49,000					.00338	.00004			
353,400	50,000					.00338	0.			
356,934	50,500					.00341	.00003			
360,468	51,000					.00343	.00002	.00162	—.00028	
360,468	51,000					.00347	.00004			
	51,000					.00347	0.	.00168	+.00006	After 5 minutes.
	51,000					.00350	.00003			
	51,000					.00354	.00004			Do.
	51,000					.00355	.00001	.00175	.00007	After 10 minutes.
70,680	10,000	—.00125	.00050							
141,360	20,000	—.00062	.00063							
212,040	30,000	+.00026	.00088							
	30,000	.00030	.00004							After 3 minutes.
247,380	35,000	.00080	.00050							
	35,000	.00089	.00009	—.00037	.00138					After 5 minutes.
141,360	20,000					.00117	.00080			
212,040	30,000					.00167	.00050			
	30,000					.00168	.00001			Do.

ALTERNATE TENSILE AND COMPRESSIVE STRESSES—Continued.

No. 2760—Continued.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
247, 380	35, 000					.00196	.00028			
	35, 000					.00198	.00002			After 5 minutes.
282, 720	40, 000					.00230	.00032			
	40, 000					.00234	.00004			Do.
218, 060	45, 000					.00275	.00041			
	45, 000					.00280	.00005			Do.
353, 400	50, 000					.00337	.00057			
	50, 000					.00346	.00009	.00166	—.00129	Do.
70, 680	10, 000	—.00117	.00049							
141, 360	20, 000	—.00060	.00057							
212, 040	30, 000	+.00017	.00077							
247, 380	35, 000	.00070	.00053							
282, 720	40, 000	.00145	.00075							
318, 060	45, 000	.00255	.00110							
353, 400	50, 000	.00412	.00157	.00225	.00391					
141, 360	20, 000					—.00116	.00109			
212, 040	30, 000					—.00031	.00085			
282, 720	40, 000					+.00096	.00127			
	40, 000					.00103	.00007			After 5 minutes.
353, 400	50, 000					.00317	.00214			
	50, 000					.00327	.00010			Do.
	50, 000					.00333	.00006			After 20 minutes.
	50, 000					.00340	.00007			After 60 minutes.
	50, 000					.00344	.00004			After 120 minutes.
	50, 000					.00344	0.			After 140 minutes.
282, 720	40, 000					.00311	—.00033			
212, 040	30, 000					.00277	—.00034			
141, 360	20, 000					.00240	—.00037			
70, 680	10, 000					.00202	—.00038	.00162	.00387	
70, 680	10, 000	—.00114	.00048							
141, 360	20, 000	—.00053	.00061							
176, 700	25, 000	—.00015	.00038							
212, 040	30, 000	+.00031	.00046							
247, 380	35, 000	.00090	.00059							
282, 720	40, 000	.00169	.00079							
	40, 000	.00179	.00010							
247, 380	35, 000	.00160	—.00019							

212, 040	30, 000	.00144	—.00016							
176, 700	25, 000	.00125	—.00019							
141, 360	20, 000	.00107	—.00018							
106, 020	15, 000	.00088	—.00019							
70, 680	10, 000	.00069	—.00019							
35, 340	5, 000	.00050	—.00019	.00030	—.00192					
35, 340	5, 000					—.00013	.00017			
70, 680	10, 000					+.00007	.00020			
106, 020	15, 000					.00030	.00023			
141, 360	20, 000					.00055	.00025			
176, 700	25, 000					.00082	.00027			
212, 040	30, 000					.00115	,00033			
	30, 000					.00117	.00002			After 5 minutes.
176, 700	25, 000					.00099	—.00018			
141, 360	20, 000					.00082	—.00017			
106, 020	15, 000					.00065	—.00017			
70, 680	10, 000					.00048	—.00017			
35, 340	5, 000					.00030	—.00018			
35, 340	5, 000	.00006	.00017					.00011	.00041	
70, 680	10, 000	.00025	.00019							
106, 020	15, 000	.00045	.00020							
141, 360	20, 000	.00065	.00020							
	20, 000	.00066	.00001							Do.
106, 020	15, 000	.00050	—.00016							
70, 680	10, 000	.00032	—.00018							
35, 340	5, 000	.00015	—.00017	—.00002	.00009					
141, 360	20, 000					.00075	.00073			
	20, 000					.00074	—.00001	.00007	.00005	Do.
141, 360	20, 000	.00065	.00072							
	20, 000	.00067	.00002	—.00001	.00006					Do.
141, 360	20, 000	.00067	0.							
212, 040	30, 000	.00112	.00045							
282, 720	40, 000	.00177	.00065							
353, 400	50, 000	.00419	.00242							
	50, 000	.00438	.00019							Do.
360, 468	51, 000	.00469	.00031							
	51, 000	.00506	.00037							Do.
	51, 000	.00525	.00019							After 2 hours. Load left on over night.
338, 500	47, 890	.00523								In the morning, after 15 hours.
360, 468	51, 000	.00533								
353, 400	50, 000	.00530	—.00003							
282, 720	40, 000	.00495	—.00035							
212, 040	30, 000	.00458	—.00037							
141, 360	20, 000	.00420	—.00038							
70, 680	10, 000	.00379	—.00041	.00335	.00336					
70, 680	10, 000	.00368								
141, 360	20, 000	.00405	.00037							
212, 040	30, 000	.00443	.00038							
282, 720	40, 000	.00482	.00039							
353, 400	50, 000	.00528	.00046							
	50, 000	.00530	.00002							After 3 minutes.
	50, 000	.00530	0.							After 10 minutes.

ALTERNATE TENSILE AND COMPRESSIVE STRESSES—Continued.

No. 2760—Continued.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
282, 720	40, 000	.00496	—.00034							
212, 040	30, 000	.00460	—.00036							
141, 360	20, 000	.00423	—.00037							
70, 680	10, 000	.00383	—.00040	.00341	.00006					
70, 680	10, 000					—.00295	.00046			
	10, 000					—.00294	.00001			After 5 minutes.
141, 360	20, 000					—.00229	.00065			
	20, 000					—.00225	.00004			Do.
212, 040	30, 000					—.00130	.00095			
	30, 000					—.00125	.00005			Do.
282, 720	40, 000					+.00033	.00158			
	40, 000					.00041	.00008			Do.
353, 400	50, 000					.00311	.00270			
	50, 000					.00328	.00017			Do.
282, 720	40, 000					.00295	—.00033			
212, 040	30, 000					.00260	—.00035			
141, 360	20, 000					.00223	—.00037			
70, 680	10, 000					.00185	—.00038			
	10, 000					.00185	0.	.00143	.00484	Do.

Test discontinued.
Test resumed after a period of rest without load of 3 months 10 days.

0	0							.00143	0.	Micrometer reset at last reading before resting.
70, 680	10, 000					.00179	.00036			
141, 360	20, 000					.00209	.00030			
212, 040	30, 000					.00239	.00030			
282, 720	40, 000					.00270	.00031			
212, 040	30, 000					.00231	—.00039			
141, 360	20, 000					.00208	—.00023			
70, 680	10, 000					.00177	—.00031	.00144	.00001	
70, 680	10, 000	—.00108	.00036	—.00145	—.00001					
141, 360	20, 000	—.00070	.00038	—.00140	.00005					
141, 360	20, 000					.00206	.00066	.00140	0.	
141, 360	20, 000	—.00070	.00070							
212, 040	30, 000	—.00014	.00056							
141, 360	20, 000	—.00045	—.00031	—.00115	.00025					

70, 680	10, 000					.00150	.00035		
141, 360	20, 000					.00185	.00035	.00119	.00004
212, 040	30, 000					.00221	.00036	.00122	.00003
282, 720	40, 000					.00260	.00039	.00129	.00007
353, 400	50, 000					.00309	.00049		
282, 720	40, 000					.00277	—.00032		
212, 040	30, 000					.00244	—.00033		
141, 360	20, 000					.00212	—.00032		
70, 680	10, 000					.00178	—.00034	.00143	.00014
70, 680	10, 000					.00175	—.00003		
141, 360	20, 000					.00207	.00032		
212, 040	30, 000					.00240	.00033		
282, 720	40, 000					.00274	.00034		
212, 040	30, 000					.00242	—.00032		
141, 360	20, 000					.00210	—.00032		
70, 680	10, 000					.00177	—.00033	.00143	0.
70, 680	10, 000	—.00100	.00043						
141, 360	20, 000	—.00057	.00043						
212, 040	30, 000	+.00001	.00058						
282, 720	40, 000	.00130	.00129						
353, 400	50, 000	.00449	.00319						
282, 720	40, 000	.00395	—.00054						
212, 040	30, 000	.00360	—.00035						
141, 360	20, 000	.00321	—.00039						
70, 680	10, 000	.00283	—.00038	.00239	.00482				
70, 680	10, 000	.00275	—.00008						
141, 360	20, 000	.00311	+.00036						
212, 040	30, 000	.00347	.00036						
282, 720	40, 000	.00386	.00039						
212, 040	30, 000	.00352	—.00034						
141, 360	20, 000	.00316	—.00036						
70, 680	10, 000	.00280	—.00036	.00240	.00001				
70, 680	10, 000					—.00195	.00045	—.00228	.00012
141, 360	20, 000					—.00135	.00060	—.00206	.00022
212, 040	30, 000					—.00054	.00081	—.00160	.00046
282, 720	40, 000					.00074	.00128		
353, 400	50, 000					.00300	.00226		
282, 720	40, 000					.00268	—.00032		
212, 040	30, 000					.00233	—.00035		
141, 360	20, 000					.00197	—.00034		
70, 680	10, 000					.00160	—.00037	.00117	.00277
70, 680	10, 000					.00150	—.00010		
141, 360	20, 000					.00185	+.00035		
212, 040	30, 000					.00221	.00036		
282, 720	40, 000					.00258	.00037		
212, 040	30, 000					.00225	—.00033		
141, 360	20, 000					.00192	—.00033		
70, 680	10, 000					.00156	—.00036	.00119	.00002

Test again discontinued.

ALTERNATE STRESSES.

No. 2761.

Second specimen from bar marked $\overset{\text{S B}^1}{\underset{\text{N}^1}{\text{L}^3\ \text{M}}}$

Same form as No. 2760.
Sectional area, 7.068 square inches.
Gauged length, 10″.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
Total.	Per square inch.	Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
		Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	
70, 680	10, 000					.00031		0.		
	10, 000	.00035		0.						
	10. 000					.00035		0.		
	10, 000	.00035		0.						
141, 300	20, 000					.00067		0.		
	20, 000	.00067		0.						
	20, 000					.00067		0.		
	20, 000	.00068		0.						
212, 040	30, 000					.00098		0.		
	30, 000	.00103		0.						
	30, 000					.00097		0.		
	30, 000	.00102		0.						
282, 720	40, 000					.00129		0.		
	40, 000	.00137		0.						
	40, 000					.00129		.00001		
	40, 000	.00137		0.						
318, 060	45, 000					.00147		.00002		Under compression stress bar deflects convex on the side carrying the micrometer.
	45, 000	.00154		0.						
	45, 000					.00147		.00003		
	45, 000	.00155		0.						
318, 060	45, 000					.00147				
325, 128	46, 000					.00150	.00003			
332, 196	47, 000					.00155	.00005			
339, 264	48, 000					.00158	.00003			
346, 332	49, 000					.00162	.00004			
353, 400	50, 000					.00165	.00003			

	50,000					.00166	.00001			After 5 minutes.
360,468	51,000					.00170	.00004			
367,536	52,000					.00176	.00006			
372,000	52,630									Elastic limit.
374,604	53,000					.00692	.00516			
	53,000					.00714	.00022			After 10 minutes.
	53,000					.00720	.00006			After 1 hour.
	53,000					.00722	.00002			After 2 hours. Load left on over night.
376,900	53,320					.00731	.00009			Load and reading in the morning, 15 hours later.
374,604	53,000					.00732	.00001			
353,400	50,000					.00728	—.00004			
282,720	40,000					.00698	—.00030			
212,040	30,000					.00663	—.00035			
141,360	20,000					.00627	—.00036			
70,680	10,000					.00588	—.00039	.00547	.00544	
70,680	10,000					.00576	—.00012			
141,360	20,000					.00606	+.00030			
212,040	30,000					.00643	.00037			
282,720	40,000					.00683	.00040			
353,400	50,000					.00725	.00042			
	50,000					.00726	.00001			After 5 minutes.
282,720	40,000					.00695	—.00031			
212,040	30,000					.00660	—.00035			
141,360	20,000					.00625	—.00035			
70,680	10,000					.00588	—.00037	.00550	.00003	
70,680	10,000	—.00487	.00063	—.00525	.00025					
70,680	10,000					.00559	.00034	.00528	.00003	
70,680	10,000	—.00486	.00001							
141,360	20,000	—.00410	.00076							
70,680	10,000	—.00443	—.00033	—.00481	.00047					
70,680	10,000	—.00444	—.00001							
141,360	20,000	—.00407	+.00037							
212,040	30,000	—.00280	.00127							
282,720	40,000	—.00051	.00229							
212,040	30,000	—.00083	—.00032							
141,360	20,000	—.00120	—.00037							
70,680	10,000	—.00157	—.00037	—.00195	.00286					
70,680	10,000	—.00160	—.00003							
141,360	20,000	—.00125	+.00035							
212,040	30,000	—.00088	.00037							
282,720	40,000	—.00042	.00046							
353,400	50,000	+.00378	.00420							
		.00398	.00020							After 5 minutes.
		.00405	.00007							After 20 minutes.
282,720	40,000	.00370	—.00035							
212,040	30,000	.00334	—.00036							
141,360	20,000	.00296	—.00038							
70,680	10,000	.00257	—.00039	.00217	.00412					

Test discontinued. Test resumed after resting unloaded 3 months 9 days.

0	0			.00217						Micrometer reset.

ALTERNATE STRESSES—Continued.

No. 2761—Continued.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
Total.	Per square inch.	Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
		Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
70, 680	10, 000	.00250	.00033	....	....	....	....	....	....	
141, 360	20, 000	.00283	.00033	....	....	....	....	....	....	
212, 040	30, 000	.00315	.00032	....	....	....	....	....	....	
282, 720	40, 000	.00352	.00037	....	....	....	....	....	....	
212, 040	30, 000	.00319	—.00033	....	....	....	....	....	....	
141, 360	20, 000	.00286	—.00033	....	....	....	....	....	....	
70, 680	10, 000	.00253	—.00033	.00218	.00001	....	....	....	....	
282, 720	40, 000	.00352	.00099	.00218	0.	....	....	....	....	
70, 860	10, 000	....	....	....	....	—.00186	.00032	—.00217	.00001	
141, 360	20, 000	....	....	....	....	—.00146	.00040	—.00212	.00005	
212, 040	30, 000	....	....	....	....	—.00086	.00060	—.00186	.00026	
70, 680	10, 000	00222	.00036	....	....	....	....	....	....	
141, 360	20, 000	.00257	.00035	....	....	....	....	....	....	
212, 040	30, 000	.00296	.00039	....	....	....	....	....	....	
282, 720	40, 000	.00339	.00043	....	....	....	....	....	....	
353, 400	50, 000	.00391	.00052	.00216	.00030	....	....	....	....	
353, 400	50, 000	....	....	....	....	.00396	.00612	....	....	
282, 720	40, 000	....	....	....	....	.00365	—.00031	....	....	
212, 040	30, 000	....	....	....	....	.00329	—.00036	....	....	
141, 360	20, 000	....	....	....	....	.00294	—.00035	....	....	
70, 680	10, 000	....	....	....	....	.00257	—.00037	.00220	.00436	
353, 400	50, 000	.00370	.00590	.00185	.00405	....	....	....	....	

Test again discontinued.

ALTERNATE STRESSES—Continued.

No. 2762.

Specimen from bar marked $^{N\,191}_{R}$
Diameter, 3″.
Sectional area, 7.068 square inches.
Gauged length, 10″.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	
70, 680	10, 000					.00030		.00002		
	10, 000	.00032		—.00002						
	10, 000					.00030		.00002		
	10, 000	.00031		—.00002						
141, 360	20, 000					.00061		.00002		
	20, 000	.00065		—.00003						
	20, 000					.00062		.00002		
	20, 000	.00065		—.00002						
212, 040	30, 000					.00093		.00003		
	30, 000	.00097		—.00002						
	30, 000					.00095		.00002		
	30, 000	.00098		—.00002						
282, 700	40, 000					.00128		.00003		
	40, 000	.00132		—.00002						
	40, 000					.00130		.00004		
	40, 000	.00132		—.00002						
318, 060	45, 000					.00147		.00003		
	45, 000	.00150		—.00002						
	45, 000					.00146		.00004		
	45, 000	.00150		—.00002						
318, 060	45, 000					.00146				
325, 128	46, 000					.00150	.00004			
332, 196	47, 000					.00151	.00001			
339, 264	48, 000					.00155	.00004			
346, 332	49, 000					.00160	.00005			
353, 400	50, 000					.00162	.00002	00004	.00002	

ALTERNATE STRESSES—Continued.

No. 2762—Continued.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch*	*Inch.*	
353, 400	50, 000	.00170	.00174	0.	.00004					
353, 400	50, 000					.00165	.00165			
360, 468	51, 000					.00167	.00002			
367, 536	52, 000					.00171	.00004			
374, 604	53, 000					.00178	.00007			Elastic limit.
364, 000	51, 500					.00341	.00163			Load fell.
367, 536	52, 000					.00405	.00064			
374, 604	53, 000					.00500	.00095			
	53, 000					.00586	.00086			After 5 minutes.
	53, 000					.00605	.00019			After 10 minutes.
	53, 000					.00630	.00025			After 60 minutes.
353, 400	50, 000					.00620	—.00010			
282, 720	40, 000					.00587	—.00033			
212, 040	30, 000					.00554	—.00033			
141, 360	20, 000					.00517	—.00037			
70, 680	10, 000					.00480	—.00037	.00437	.00437	
70, 680	10, 000					.00467	—.00013			
141, 360	20, 000					.00500	+.00033			
212, 040	30, 000					.00537	.00037			
282, 720	40, 000					.00570	.00033			
353, 400	50, 000					.00612	.00042			
282, 720	40, 000					.00580	—.00032			
212, 040	30, 000					.00548	—.00032			
141, 360	20, 000					.00515	—.00033			
70, 680	10, 000					.00479	—.00036	.00440	.00003	

Test discontinued.

TENSION TEST.

No. 2763.

Second specimen from bar marked $^{N}{}_{R}{}^{191}$
Same form as No. 2760.
Diameter, 3″.
Sectional area, 7.068 square inches.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	
70,680	10,000	.00028	.00028	....	....	
144,360	20,000	.00060	.00032	....	....	
212,040	30,000	.00095	.00035	....	....	
282,720	40,000	.00129	.00034	....	....	
212,040	30,000	.00095	—.00034	....	....	
141,360	20,000	.00063	—.00032	....	....	
70,680	10,000	.00028	—.00035	—.00001	—.00001	
282,720	40,000	.00130	+.00102	....	....	
318,060	45,000	.00145	.00015	....	....	
325,128	46,000	.00150	.00005	....	....	
332,196	47,000	.00154	.00004	....	....	
339,264	48,000	.00157	.00003	....	....	
346,332	49,000	.00160	.00003	....	....	
353,400	50,000	.00164	.00004	....	....	
360,468	51,000	.00167	.00003	....	....	
367,536	52,000	.00171	.00004	....	....	
374,604	53,000	.00175	.00004	....	....	
381,672	54,000	.00180	.00005	....	....	Elastic limit.
386,000	54,610	....	....	....	....	
374,604	53,000	.00355	.00175	....	....	
381,672	54,000	.00540	.00185	....	....	
	54,000	.00580	.00040	.00374	.00375	

Load released and rested over night—15 hours.

NOTE.—The full stretch under the last load, 54,000 pounds per square inch, was not exhausted when the load was released.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
0	0	....	....	.00374	....	
70,680	10,000	.00408	....	....	....	
141,360	20,000	.00445	.00037	....	....	
212,040	30,000	.00480	.00035	....	....	
282,720	40,000	.00520	.00040	....	....	
353,400	50,000	.00562	.00042	....	....	
282,720	40,000	.00527	.00035	....	....	
212,040	30,000	.00493	.00034	....	....	
141,360	20,000	.00456	.00037	....	....	
70,680	10,000	.00417	.00039	.00379	.00005	
70,680	10,000	.00412	—.00005	....	....	
141,360	20,000	.00448	.00036	....	....	
212,040	30,000	.00485	.00037	....	....	
282,720	40,000	.00522	.00037	....	....	
353,400	50,000	.00562	.00040	....	....	
282,720	40,000	.00527	—.00035	....	....	
212,040	30,000	.00493	—.00034	....	....	
141,360	20,000	.00457	—.00036	....	....	
70,680	10,000	.00420	—.00037	.00380	.00001	

Test discontinued.

No. 2763—Continued.

Test resumed after resting without load 3 months 21 days.

[Micrometer reset.]

Applied loads.		Under tensile stress.				Under compressive stress.			
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.	
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
0	0	...	....	.00380	....	....	....	....	....
70, 680	10, 000	.00409	.00029	....	....	....	....	....	....
141, 360	20, 000	.00442	.00033	....	....	....	....	....	....
212, 040	30, 000	.00477	.00035	....	....	....	....	....	....
282, 720	40, 000	.00513	.00036	....	....	....	....	....	....
353, 400	50, 000	.00551	.00038	....	....	....	....	....	....
282, 720	40, 000	.00518	—.00033	....	....	....	....	....	....
212, 040	30, 000	.00485	—.00033	....	....	....	....	....	....
141, 360	20, 000	.00449	—.00036	....	....	....	....	....	....
70, 680	10, 000	.00417	—.00032	.00385	.00005	....	....	....	....
70, 680	10, 000	....	....	....	....	—.00349	.00036	—.00383	.00002
141, 360	20, 000	....	....	....	....	—.00297	.00052	—.00364	.00019
212, 040	30, 000	....	....	....	....	—.00210	.00087	—.00311	.00053
282, 720	40, 000	....	....	....	....	—.00043	.00167	—.00180	.00031
282, 720	40, 000	.00384	.00204	.00244	.00064	....	....	....	....
70, 680	10, 000	....	....	....	....	—.00210	.00034	—.00241	.00003
141, 360	20, 000	....	....	....	....	—.00167	.00043	—.00233	.00008

COMPRESSION TEST.

No. 2764.

Initial compression of first specimen from bar marked $\substack{S\ B_2 \\ L_1 M}$
Cylindrical shape. Uniform diameter.
Length, 23″.
Diameter, 4″.180.
Sectional area, 13″.72.
Gauged length, 10″.
A light chip was turned off bar to straighten it.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
13,720	1,000	0.	0.	0.	0.	Initial load.
68,600	5,000	.00010	.00010			
137,200	10,000	.00022	.00012			
205,800	15,000	.00035	.00013			
274,400	20,000	.00053	.00018			
343,000	25,000	.00069	.00016			
411,600	30,000	.00083	.00014			
480,200	35,000	.00102	.00019			
548,800	40,000	.00114	.00012			
480,200	35,000	.00100	—.00014			
411,600	30,000	.00085	—.00015			
343,000	25,000	.00069	—.00016			
274,400	20,000	.00054	—.00015			
205,800	15,000	.00040	—.00014			
137,200	10,000	.00026	—.00014			
68,600	5,000	.00010	—.00016	—.00001	—.00001	
68,600	5,000	.00012	+.00002			
137,200	10,000	.00025	.00013			
205,800	15,000	.00040	.00015			
274,400	20,000	.00054	.00014			
343,000	25,000	.00070	.00016			
411,600	30,000	.00086	.00016			
480,200	35,000	.00101	.00015			
548,800	40,000	.00117	.00016			
617,400	45,000	.00133	.00016			
631,120	46,000	.00136	.00003			
644,840	47,000	.00140	.00004			
658,560	48,000	.00143	.00003			
672,280	49,000	.00147	.00004			
686,000	50,000	.00151	.00004	—.00002	—.00001	
699,720	51,000	.00154	.00003			
713,440	52,000	.00165	.00011			Elastic limit. Sustained this load momentarily; then rapid yielding began, and load fell.
699,720	51,000	.00169	.00004			
713,440	52,000	.00220	.00051			Bar perceptibly deflected.
727,160	53,000	.00495	.00275			
	53,000	.00740	.00245			After 5 minutes, during which interval there was experienced a period of rapid yielding.
	53,000	.00761	.00021			After 10 minutes.
	53,000	.00766	.00005			After 15 minutes.
	53,000	.00770	.00004			After 20 minutes.
	53,000	.00773	.00003			After 25 minutes.
	53,000	.00775	.00002			After 30 minutes.
686,000	50,000	.00766	—.00009			
617,400	45,000	.00749	—.00007			
548,800	40,000	.00731	—.00018			
480,200	35,000	.00717	—.00014			
411,600	30,000	.00695	—.00022			
343,000	25,000	.00677	—.00018			
274,400	20,000	.00659	—.00018			
205,800	15,000	.00639	—.00020			
137,200	10,000	.00620	—.00019			

No. 2764—Continued.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch,*	
68, 600	5, 000	.00597	— .00023	.00578	.00580	
68, 600	5, 000	.00591	— .00006	....	....	
137, 200	10, 000	.00609	+ .00018	....	....	
205, 800	15, 000	.00626	.00017	....	....	
274, 400	20, 000	.00644	.00018	....	....	
343, 000	25, 000	.00662	.00018	....	....	
411, 600	30, 000	.00680	.00018	....	....	
480, 200	35, 000	.00699	.00019	....	....	
548, 800	40, 000	.00718	.00019	....	....	
617, 400	45, 000	.00738	.00020	....	....	
686, 000	50, 000	.00761	.00023	....	....	
617, 400	45, 000	.00745	.00016	....	....	
548, 800	40, 000	.00728	— .00017	....	....	
480, 200	35, 000	.06709	— .00019	....	....	
411, 600	30, 000	.00693	— .00016	....	....	
343, 000	25, 000	.00675	— .00018	....	....	
274, 400	20, 000	.00657	— .00018	....	....	
205, 800	15, 000	.00639	— .00018	....	....	
137, 200	10, 000	.00620	— .00019	....	....	
	10, 000	.00617	— .00003	....	....	After 2 minutes.
68, 600	5, 000	.00599	— .00018	.00581	.00003	
686, 000	50, 000	.00755	+ .00156	....	....	
	50, 000	.00759	.00004	....	....	After 25 minutes. Left under load over night.
658, 500	48, 000	.00753	....	....	....	Load and reading in morning; 15 hours rest.
686, 000	50, 000	.00760	....	....	....	
617, 400	45, 000	.00745	— .00015	....	....	
548, 800	40, 000	.00728	— .00017	....	....	
480, 200	35, 000	.00712	— .00016	....	....	
411, 600	30, 000	.00693	— .00019	....	....	
343, 000	25, 000	.00677	— .00016	....	....	
274, 400	20, 000	.00658	— .00019	....	....	
205, 800	15, 000	.00642	— .00016	....	....	
137. 200	10, 000	.00624	— .00018	....	....	
68, 600	5, 000	.00602	— .00022	.00591	.00010	
	....	....	....	.00585	— .00006	After 2 minutes.
	......	....	....	.00585	0	After 4 minutes.
68, 600	5, 000	.00600	— .00002	....	....	
	5, 000	.00600	0.	....	....	After 2 minutes.
137, 200	10, 000	.00617	+ .00017	....	....	
	10, 000	.00617	0.	....	....	Do.
274, 400	20, 000	.00653	.00036	....	....	
	20, 000	.00653	0.	....	....	Do.
411, 600	30, 000	.00686	.00033	....	....	
	30, 000	.00688	.00002	....	....	Do.
548, 800	40, 000	.00723	.00035	....	....	
	40, 000	.00725	.00002	....	....	Do.
686, 000	50, 000	.00762	.00037	....	....	
	50, 000	.00763	.00001	....	....	Do.
548, 800	40, 000	.00731	.00032	....	....	
	40, 000	.00730	— .00001	....	....	Do.
411, 600	30, 000	.00698	— .00032	....	....	
	30, 000	.00697	— .00001	....	....	Do.
274, 400	20, 000	.00662	— .00035	....	....	
	20, 000	.00662	0.	....	....	Do.
137, 200	10, 000	.00625	— .00037	....	....	
	10, 000	.00625	0.	....	....	Do.
68, 600	5, 000	.00607	— .00018	....	....	
	5, 000	.00606	— .00001	....	....	Do.
13, 720	1, 000	....	....	.00590	.00005	
	1, 000	....	....	.00588	— .00002	Do.

Bar deflected ″.02. Maximum concavity 90° from the position of the micrometer.

Test discontinued.

Two lines, 10″ ± each, laid off parallel to the original gauged length and 120° distant, which, with the original gauged length, measured as follows: Line A, 9″.9940; line B, 9″.9360; line C, 9″.9965.

Specimen turned down at the middle of its length, a distance of about 8 inches, to 3″.3 diameter; lines on surface then measured as follows: Line A, 9″.9945; line B, 9″.9370; line C, 9″.9965.

The slight increase in mean length of lines is hardly sufficient to attribute, with certainty, to the release of initial strains by reason of the removal of some of the metal in turning down the specimen to 3″.3 diameter. The bar was remeasured when taken directly from the lathe, and its temperature may have been higher than that of the standard bar at this time, accounting for the apparent increase in mean length. The specimen was finished 3″ diameter by 12″ long. After a period of rest of 7 days 7 hours, the testing was resumed.

Sectional area, 7″.068 square inches. Gauged length, 10″.

No. 2764—Continued.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	
70, 680	10, 000	....	....	....	....	.00033	.00033	....	....	
141, 360	20, 000	....	....	....	....	.00067	.00034	....	....	
212, 040	30, 000	....	....	....	....	.00101	.00034	....	....	
282, 720	40, 000	....	....	....	....	.00140	.00039	—.00002	—.00002	
70, 680	10, 000	.00039	.00037	....	....	....	....	....	....	
141, 360	20, 000	.00112	.00073	.00034	.00032	....	....	....	....	
212, 040	30, 000	....	....	.00137	.00103	Tensile stress applied and instantly released.				
282, 720	40, 000	....	....	.00355	.00218	Tensile stress applied and instantly released.				
282, 720	40, 000	....	....	....	....	—.00074	.00281	....	....	
	40, 000	....	....	....	....	—.00069	.00005	....	....	After 5 minutes.
282, 720	40, 000	Compression load left on over night.								
217, 400	30, 760	....	....	....	....	—.00098	....	....	....	Compression load found on the bar in the morning, 15 hours later.
282, 720	40, 000	....	....	....	....	—.00067	....	—.00210	....	
212, 040	30, 000	....	....	.00280	....	Tensile stress applied and instantly released.				
282, 720	40, 000	....	....	....	....	—.00075	....	....	....	
	40, 000	....	....	....	....	—.00070	....	—.00213	....	After 5 minutes.
282, 720	40, 000	....	....	.00364	....	Tensile stress applied and instantly released.				
282, 720	40, 000	....	....	....	....	—.00095	....	....	....	
	40, 000	....	....	....	....	—.00089	....	—.00236	....	After 25 minutes.
282, 720	40, 000	....	....	.00373	....	Tensile stress applied and instantly released.				
282, 720	40, 000	....	....	....	....	—.00109	....	....	....	
	40, 000	....	....	....	....	—.00098	....	....	....	After 50 minutes.

Load reversed, applying 40,000 pounds per square inch tensile stress, which was instantly released, and immediately applying the same amount of compression stress.

282, 720	40, 000					—. 00120				
	40, 000					—. 00112		—. 00257		After 5 minutes.
70, 680	10, 000	. 00300								
141, 360	20, 000	. 00350								
212, 040	30, 000	. 00420								
282, 720	40, 000	. 00529								
	40, 000	. 00534								After 2 minutes.
141, 360	20, 000	. 00463		. 00387						
141, 360	20, 000					—. 00293				
282, 720	40, 000					—. 00124				
	40, 000					—. 00120				After 5 minutes.

Load reversed to 40,000 pounds per square inch tension, which was instantly released, immediately re-applying 40,000 pounds per square inch compression.

282, 720	40, 000					—. 00130				
						—. 00124				After 5 minutes.

Compression stress quickly released.

282, 720	40, 000					Tension stress applied and instantly released.				
0	0			. 00400						

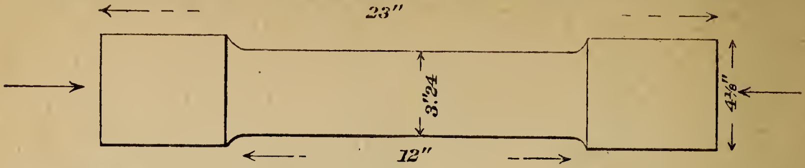
Tensile stress now gradually applied and released.

282, 720	40, 000	. 00551		. 00406						
282, 720	40, 000					—. 00135		—. 00280		

Test discontinued.

No. 2765.

Initial compression of second specimen from bar marked $^{S\,B_3}_{L_1\,M}$



Sectional area, 8.24 square inches.
Gauged length, 10".

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
8, 240	1, 000	0.	0.	0.	0.	Initial load.
41, 200	5, 000	. 00015	. 00015	....	....	
82, 400	10, 000	. 00030	. 00015	....	....	
123, 600	15, 000	. 00047	. 00017	....	....	
164, 800	20, 000	. 00062	. 00015	....	....	
206, 000	25, 000	. 00078	. 00016	....	....	
247, 200	30, 000	. 00095	. 00017	....	....	
288, 400	35, 000	. 00111	. 00016	....	....	
329, 600	40, 000	. 00128	. 00016	....	....	
370, 800	45, 000	. 00145	. 00017	....	....	
379, 040	46, 000	. 00148	. 00003	....	....	
387, 280	47, 000	. 00151	. 00003	....	....	
395, 520	48, 000	. 00155	. 00004	....	....	
403, 760	49, 000	. 00159	. 00004	....	....	
412, 000	50, 000	. 00161	. 00002	....	....	
420, 240	51, 000	. 00166	. 00005	....	....	
428, 480	52, 000	. 00170	. 00004	....	....	
436, 720	53, 000	. 00174	. 00004	....	....	Elastic limit.
416, 120	50, 500	. 00312	. 00038	....	....	
420, 240	51, 000	. 00495	. 00183	....	....	
428, 480	52, 000	. 00666	. 00171	....	....	
436, 720	53, 000	. 00755	. 00089	....	....	
444, 960	54, 000	. 00835	. 00080	....	....	
453, 200	55, 000	. 00934	. 00099	....	....	
461, 440	56, 000	. 01010	. 00076	....	....	
469, 680	57, 000	. 01100	. 00090	....	....	
477, 920	58, 000	. 01190	. 00090	....	....	
486, 160	59, 000	. 01272	. 00082	....	....	
494, 400	60, 000	. 01397	. 00025	....	....	
	....	. 01424	. 00027	....	....	After 5 minutes.
	....	. 01434	. 00010	....	....	After 10 minutes.
	....	. 01455	. 00021	....	....	After 70 minutes.
						Load allowed to remain on bar over Sunday; in all, 46 hours.
493, 300	....	. 01525	....	....	....	After 46 hours' rest.
494, 400	60, 000	. 01527	....	....	....	
453, 200	55, 000	. 01511	—. 00016	....	....	
412, 000	50, 000	. 01495	—. 00016	....	....	
329, 600	40, 000	. 01459	—. 00036	....	....	
247, 200	30, 000	. 01423	—. 00036	....	....	
164, 800	20, 000	. 01385	—. 00038	....	....	
82, 400	10, 000	. 01345	—. 00040	. 01303	. 01303	
88, 240	1, 000	....	....	. 01301	—. 00002	After 5 minutes.
82, 400	10, 000	. 01331	—. 00014	....	....	
164, 800	20, 000	. 01366	+. 00035	....	....	
247, 200	30, 000	. 01403	. 00037	....	....	
329, 600	40, 000	. 01440	. 00037	....	....	
412, 000	50,000	. 01478	. 00038	....	....	
453, 200	55, 000	. 01500	. 00022	....	....	
494, 400	60, 000	. 01531	. 00031	....	....	
	60, 000	. 01530	—. 00001	....	....	After 3 minutes.
453, 200	55, 000	. 01514	—. 00016	....	....	
412, 000	50, 000	. 01496	—. 00018	....	....	
329, 600	40, 000	. 01462	—. 00034	....	....	
247, 200	30, 000	. 01426	—. 00036	....	....	
164, 800	20, 000	. 01390	—. 00036	....	....	
82, 400	10, 000	. 01351	—. 00039	. 01313	. 00012	
8, 240	1, 000	....	....	. 01312	—. 00001	After 5 minutes.

Initial compression test discontinued.

Bar rested 3 days 5 hours, stem turned down to 3″ diameter, and test resumed.

Sectional area, 7.068 square inches.

New gauged length established, 10″.

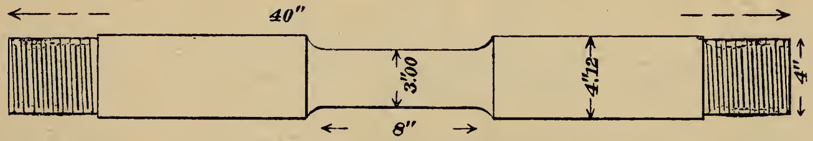
Applied loads.		Under tensile stress.				Under compressive stress.			
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.	
Total.	Per sq. inch.	Total	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
0	0	0.	0.	0.	0.	0.	0.	0.	0.
70, 680	10, 000	....	....	....	....	.00035	.00035	....	....
141, 360	20, 000	....	....	....	....	.00068	.00033	....	....
212. 040	30, 000	....	....	....	....	.00105	.00037	....	....
282, 720	40, 000	....	....	....	....	.00143	.00038	0.	....
	40, 000	....	....	....	....	.00143	0.	....	....
318, 060	45, 000	....	....	....	....	.00162	.00019	....	....
353, 400	50, 000	....	....	....	....	.00183	.00021	.00001	.00001
388, 740	55, 000	....	....	....	....	.00208	.00025	....	....
424, 080	60, 000	....	....	....	....	.00247	.00039	.00017	.00016
70, 680	10, 000	.00038	.00055	....	....	....	....	....	....
141, 360	20, 000	.00120	.00082	.00047	.00064	....	....	....	....
212, 040	30, 000	.00260	.00140	.00149	.00102	....	....	....	....
70, 680	10, 000	....	....	....	....	—.00110	.00039	....	....
141, 360	20. 000	....	....	....	....	—.00068	.00042	—.00138	.00011
212, 040	30, 000	....	....	....	....	—.00021	.00047	....	....
282, 720	40, 000	....	....	....	....	+.00036	.00057	—.00110	.00028
353, 400	50, 000	....	....	....	....	.00113	.00077	—.00075	.00035
282, 720	40, 000	....	....	.00367	.00292	Tensile stress applied and instantly released.			
70, 680	10, 000	....	....	....	....	—.00325	.00042	....	....
141, 360	20, 000	....	....	....	....	—.00269	.00056	—.00350	.00017
212, 040	30, 000	....	....	....	....	—.00220	.00049	....	....
282, 720	40, 000	....	....	....	....	—.00144	.00076	—.00291	.00059
353, 400	50, 000	....	....	....	....	—.00019	.00125	—.00209	.00082
70, 680	10, 000	.00255	.00046	....	....	....	....	....	....
141, 360	20, 000	.00314	.00059	....	....	....	....	....	....
212, 040	30, 000	.00392	.00078	....	....	....	....	....	....
282, 720	40, 000	.00543	.00151	....	....	....	....	....	....
318, 060	45, 000	.00784	.00241	....	....	....	....	....	....
	45, 000	.00787	.00003	....	....	....	....	After 2 minutes.	
282, 720	40, 000	.00780	—.00007	....	....	....	....	....	....
212, 040	30, 000	.00743	—.00037	....	....	....	....	....	....
141, 360	20, 000	.00705	—.00038	....	....	....	....	....	....
70, 680	10, 000	.00667	—.00038	.00624	.00475	....	....	....	....

Test discontinued.

ALTERNATE STRESSES AT HIGHER TEMPERATURES.

No. 2766.

Specimen from bar marked $\frac{N\ R}{192}$



Sectional area, 7.068 square inches.
Gauged length, 6".

Expansion in 6" when hot, ".0132.
Estimated temperature, 403° Fahr.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	
70, 680	10, 000					.00042		—.00003		
70, 680	10, 000	.00030		0.						
141, 360	20, 000					.00060		.00007		
141, 360	20, 000	.00058		—.00007						
212, 040	30, 000					.00115		.00008		
212, 040	30, 000	.00100		.00002						
282, 720	40, 000					.00142		.00007		
282, 720	40, 000	.00135		.00002						
318, 060	45, 000					.00183		.00032		
318, 060	45, 000	.00175		.00020						
318, 060	45, 000					.00197				
	45, 000					.00195		.00042		After 5 minutes.
318, 060	45, 000	.00183								
	45, 000	.00193		.00033						
339, 264	48, 000					.00235				
	48, 000					.00248		.00082		Do.
339, 264	48, 000	.00222								

	48,000	.00225		.00065						Do.
353,400	50,000					.00288		.00120		
353,400	50,000	.00258		.00075						
367,536	52,000					.00317				
	52,000					.00330		.00157		
367,536	52,000	.00287		.00108						
381,672	54,000					.00383		.00192		
381,672	54,000	.00335		.00135						
424,080	60,000					.00573		.00350		
424,080	60,000	.00528		.00292						
424,080	60,000					.00560				
	60,000					.00582		.00345		After 5 minutes.
								.00348		Set after 5 minutes.

Hot test discontinued.
Contraction of bar in 6″ in cooling, ″.0120.
Estimated temperature at the close of the hot test, 372° Fahr.

0	0							.00328		
70,680	10,000					.00352		.00328		
70,680	10,000	.00288		—.00328						
141,360	20,000					.00400		.00328		
141,360	20,000	.00262		—.00328						
212,040	30,000					.00428		.00327		
212,040	30,000	—.00225		—.00328						
282,720	40,000					.00457		.00328		
282,720	40,000	—.00178		—.00317						
318,060	45,000					.00480		.00328		
318,060	45,000	—.00153		—.00307						
353,400	50,000					.00493		.00328		
353,400	50,000	—.00117		—.00283						
367,536	52,000					.00487	.00204			
381,672	54,000					.00503	.00016			
395,808	56,000					.00507	.00004			
409,944	58,000					.00523	.00016			
424,080	60,000					.00533	.00010	.00333	.00005	
367,536	52,000	—.00073	.00260							
381,672	54,000	—.00028	.00045							
395,808	56,000	+.00065	.00093							
	56,000	.00087	.00022							After 10 minutes.
409,944	58,000	.00180	.00093							
424,080	60,000	.00338	.00158							
	60,000	.00362	.00024	.00137	.00470					Do.

Bar rested without load 39 hours.

0	0			.00137					
141,360	20,000					—.00037	.00100		
282,720	40,000					+.00145	.00132		
424,080	60,000					.00528	.00383		
	60,000					.00537	.00009		
353,400	50,000					.00505	—.00032		

ALTERNATE STRESSES AT HIGHER TEMPERATURES—Continued.

No. 2766—Continued.

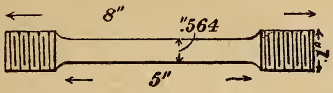
Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
282, 720	40, 000	....	....	....	....	.00475	—.00030	....	....	
212, 040	30, 000	....	....	....	....	.00438	—.00037	....	....	
141, 360	20, 000	....	....	....	....	.00397	—.00041	....	....	
70, 680	10, 000	....	....	....	....	.00363	—.00034	.00322	.00459	
70, 680	10, 000	—.00277	.00045	....	....	....	....	....	....	
141, 360	20, 000	—.00222	.00055	....	....	....	....	....	....	
212, 040	30, 000	—.00147	.00075	....	....	....	....	....	....	
282, 720	40, 000	—.00045	.00102	....	....	....	....	....	....	
353, 400	50, 000	+.00120	.00165	....	....	....	....	....	....	
282, 720	40, 000	.00095	—.00025	....	....	....	....	....	....	
212, 040	30, 000	.00055	—.00040	....	....	....	....	....	....	
141, 360	20, 000	.00020	—.00035	....	....	....	....	....	....	
70, 680	10, 000	—.00027	—.00047	—.00062	.00260	....	....	....	....	
141, 360	20, 000	....	....	....	....	.00153	.00091	.00085	.00023	

Test discontinued.

TENSION TEST.

No. 2767.

Small specimen taken from bar marked $\frac{\text{N. R.}}{\text{192.}}$



Sectional area, .25 square inch.
Gauged length, 5″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.00008	.00008			
2,500	10,000	.00026	.00018			
3,750	15,000	.00044	.00018			
5,000	20,000	.00062	.00018			
6,250	25,000	.00076	.00014			
7,500	30,000	.00094	.00018			
8,750	35,000	.00108	.00014			
10,000	40,000	.00128	.00020	—.00002	—.00002	
11,250	45,000	.00144	.00016			
11,750	47,000	.00148	.00004			
12,000	48,000	.00154	.00006			Elastic limit.
12,200	48,800					Load fell.
12,000	48,000	.00316	.00162			
12,250	49,000	.00620	.00304			
12,500	50,000	.00940	.00320			
12,750	51,000	.00992	.00052			
13,000	52,000	.01080	.00088			
13,500	54,000	.01320	.00240			
14,000	56,000	.01560	.00240			
14,500	58,000	.01820	.00260			
15,000	60,000	.02080	.00260			
15,500	62,000	.02400	.00320			
16,000	64,000	.02720	.00320			
16,500	66,000	.03080	.00360			
17,000	68,000	.03500	.00420			
17,500	70,000	.04000	.00500			
18,000	72,000	.048	.008			
18,500	74,000	.056	.008			
19,000	76,000	.064	.008			
19,500	78,000	.084	.020			
19,820	79,280	.130	.046			Tensile strength.
14,300						At time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	79,280
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	0.218
Elongation per inch under strain at elastic limit	do...	.00154
Reduction in diameter at point of rupture	do...	.224
Reduction in area after rupture, per centum of original section		83.9
Position of rupture		at middle of length
Character of broken surface		fine silky
Elongation of inch sections		".12, ".20, ".49,* ".17, ".11

COMPRESSION TEST.

No. 2768.

Small specimen from bar marked $\frac{N\ R}{192}$
Length, 8″.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	0.	0.	Initial load.
4,000	5,000	.00012	.00012	....	....	
8,000	10,000	.00028	.00016	....	....	
12,000	15,000	.00044	.00016	....	....	
16,000	20,000	.00060	.00016	....	....	
20,000	25,000	.00076	.00016	....	....	
24,000	30,000	.00094	.00018	....	....	
28,000	35,000	.00110	.00016	....	....	
32,000	40,000	.00126	.00016	0.	....	
36,000	45,000	.00144	.00018	....	....	
36,800	46,000	.00148	.00004	....	....	
37,600	47,000	.00152	.00004	....	....	
38,400	48,000	.00156	.00004	....	....	
39,200	49,000	.00160	.00004	....	....	
40,000	50,000	.00166	.00006	.00006	.00006	Elastic limit.
....	50,000	.00170	.00004	....	....	
40,800	51,000	.00174	.00004	....	....	
41,600	52,000	.00256	.00082	....	....	
42,400	53,000	.00664	.00408	....	....	
43,200	54,000	.00772	.00108	....	....	
44,000	55,000	.00816	.00044	.00618	.00612	
51,300	64,120	....	....	....	....	Ultimate strength.

Failed by triple flexure.

Second compression specimen from bar marked $^{\text{N R}}_{192}$

No. 2769.

Length, 8″.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	0.	0.	Initial load.
4,000	5,000	.00012	.00012	....	....	
8,000	10,000	.00030	.00018	....	....	
12,000	15,000	.00046	.00016	....	....	
16,000	20,000	.00062	.00016	....	....	
20,000	25,000	.00078	.00016	.00020	.00020	
24,000	30,000	.00096	.00018	....	....	
28,000	35,000	.00114	.00018	....	....	
32,000	40,000	.00130	.00016	.00040	.00020	
36,000	45,000	.00146	.00016	....	....	
36,800	46,000	.00150	.00004	....	....	
37,600	47,000	.00152	.00002	....	....	
38,400	48,000	.00156	.00004	....	....	
39,200	49,000	.00160	.00004	....	....	
40,000	50,000	.00160	0.	.00040	0.	
40,800	51,000	.00164	.00004	....	....	Elastic limit.
41,600	52,000	.00334	.00170	....	....	
42,400	53,000	.00810	.00476	....	....	
43,200	54,000	.00920	.00110	....	....	
44,000	55,000	.01060	.00140	.00844	.00804	
51,780	64,720	....	....	....	....	Ultimate strength.

Failed by triple flexure.

SPECIMENS FROM 10″ JACKET, WHITWORTH STEEL.

EFFECT OF OVER-COMPRESSION.

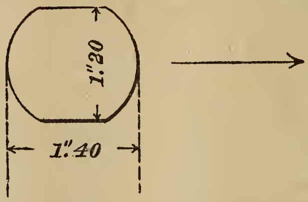
A fragment of the ring 6″ long and 1″.20 thick was annealed, and specimens Nos. 2561 and 2562 taken out side by side.

For original tests of this ring, see Report 1886.

No. 2561.

Specimen compressed 2 per cent. of its length.

Form of cross-section.



Direction of deflection.

Original dimensions. { Length, 5″.20.
Diameter, 1″.40.

Diameter between flat sides, 1″.20.

Approximate sectional area, 1.44 square inches.

Compressive stress, 72.500 pounds=50.350 pounds per square inch; permanently shortened the specimen 2 per cent. of its original length.

The specimen deflected in the plane of the two flat sides, ″.01½ v. sine of chord.

Eight lines, 45° apart, of inch sections were laid off on specimen parallel to its axis before applying the compressive stress.

Measuring these sections with a steel scale after compression, the metal on all sides was found permanently compressed.

The difference in the amount of shortening on the convex and concave sides was barely perceptible; measuring with a steel scale, the variation in any inch section from the prescribed amount of ″.02 did not reach ″.00½.

Specimen now turned down to a tensile form having a stem 3″ long by ″.75 diameter.

Diameter of threaded ends, 1″.

Sectional area, .4418 square inch.

Gauged length, 3″.

No. 2561—Continued.

Applied loads.		Elongation per inch.	Successive elongation per inch	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
442	1,000	0.	0.	0.	0.	Initial load.
2,209	5,000	.000167	.000167			
4,418	10,000	.000367	.000200			
4,860	11,000	.000367	0.			
5,302	12,000	.000400	.000033			Elastic limit.
5,743	13,000	.000533	.000133			
6,185	14,000	.000633	.000100			
6,627	15,000	.000733	.000100	.000267	.000267	
7,069	16,000	.000933	.000200			
7,510	17,000	.001067	.000133			
7,952	18,000	.001233	.000166			
8,394	19,000	.001400	.000167			
8,836	20,000	.001567	.000167	.000900	.000633	
9,278	21,000	.001733	.000166			
9,720	22,000	.001967	.000234			
10,161	23,000	.002267	.000300			
10,603	24,000	.002567	.000300			
11,045	25,000	.002867	.000300	.001967	.001067	
11,487	26,000	.003133	.000266			
11,929	27,000	.003467	.000334			
12,371	28,000	.003767	.000300			
12,812	29,000	.004267	.000500			
13,254	30,000	.004733	.000466	.003633	.001666	
13,696	31,000	.005100	.000367			
14,138	32,000	.005500	.000400			
14,580	33,000	.005933	.000433			
15,021	34,000	.006600	.000667			
15,463	35,000	.007167	.000567	.005900	.002267	
15,905	36,000	.007833	.000666			
16,347	37,000	.008433	.000600			
16,789	38,000	.009367	.000934			
17,230	39,000	.010133	.000766			
17,672	40,000	.010967	.000834	.009467	.003567	
18,114	41,000	.011667	.000700			
18,556	42,000	.012667	.001000			
18,998	43,000	.013667	.001000			
19,440	44,000	.014867	.001200			
19,881	45,000	.016400	.001533	.014600	.005133	
20,323	46,000	.017067	.000667			
20,765	47.000	.018600	.001533			
21,207	48,000	.020233	.001633			
21,649	49,000	.021933	.001700			
22,090	50,000	.023767	.001834	.021733	.007133	
22,974	52,000	.0250	.001233			
23,858	54,000	.1283	.0033			
24,741	56,000	.0333	.0050			
25,625	58,000	.0383	.0050			
26,508	60,000	.0417	.0034			
27,392	62,000	.0500	.0083			
28,276	64,000	.0600	.0100			
29,160	66,000	.0667	.0067			
30,043	68,000	.0800	.0133			
30,926	70,000	.0967	.0167			
31,810	72,000	.1200	.0233			
32,660	73,920	.1767	.0567			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	73,920
Elastic limit per square inch of original section	do....	12,000
Elongation per inch after rupture	inch..	0.2367
Elongation per inch under strain at elastic limit	do....	.000400
Reduction in diameter at point of rupture	do....	.17
Reduction in area after rupture, per centum of original section		40.2
Position of rupture		at middle of stem
Character of broken surface		silky, 50 per cent.; granular, 50 per cent. Opened a crack in surface of stem ″.90 from point of rupture
Elongation of inch sections		″.15, ″.41*, ″.10

No. 2562.

Tensile specimen not compressed.
Diameter, ″.75.
Sectional area, .4418 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
442	1,000	0.	0.	0.	0.	Initial load.
2,209	5,000	.000133	.000133	0.	-----------	
4,418	10,000	.000333	.000200	0.	-----------	
4,860	11,000	.000367	.000034	-----------	-----------	
5,302	12,000	.000400	.000033	-----------	-----------	
5,743	13,000	.000433	.000033	-----------	-----------	
6,185	14,000	.000467	.000034	-----------	-----------	
6,627	15,000	.000500	.000033	.000033	.000033	
7,069	16,000	.000500	0.	-----------	-----------	
7,510	17,000	.000567	.000067	-----------	-----------	
7,952	18,000	.000633	.000066	-----------	-----------	
8,394	19,000	.000667	.000034	-----------	-----------	
8,836	20,000	.000700	.000033	.000033	0.	
9,278	21,000	.000733	.000033	-----------	-----------	
9,720	22,000	.000767	.000034	-----------	-----------	
10,161	23,000	.000800	.000033	-----------	-----------	
10,603	24,000	.000800	0.	-----------	-----------	
11,045	25,000	.000867	.000067	.000033	0.	
11,487	26,000	.000900	.000033	-----------	-----------	
11,929	27,000	.000933	.000033	-----------	-----------	
12,371	28,000	.000967	.000034	-----------	-----------	
12,812	29,000	.001000	.000033	-----------	-----------	
13,254	30,000	.001033	.000033	.000033	0.	
13,696	31,000	.001033	0.	-----------	-----------	
14,138	32,000	.001067	.000034	-----------	-----------	
14,580	33,000	.001133	.000066	-----------	-----------	
15,121	34,000	.001167	.000034	-----------	-----------	
15,463	35,000	.001200	.000033	.000033	0.	
15,905	36,000	.001267	.000067	-----------	-----------	Elastic limit.
16,347	37,000	.003067	.001800	-----------	-----------	
		.007067	.004000	-----------	-----------	
16,789	38,000	.007733	.000666	-----------	-----------	
17,230	39,000	.008333	.000600	-----------	-----------	
17,672	40,000	.009200	.000867	.007667	.007634	
18,114	41,000	.009900	.000700	-----------	-----------	
18,556	42,000	.010900	.001000	-----------	-----------	
18,998	43,000	.012000	.001100	-----------	-----------	
19,440	44,000	.012900	.000900	-----------	-----------	
19,881	45,000	.013900	.001000	.012067	.004400	
20,323	46,000	.014633	.000733	-----------	-----------	
20,765	47,000	.015767	.001134	-----------	-----------	
21,207	48,000	.016867	.001100	-----------	-----------	
21,649	49,000	.018067	.001200	-----------	-----------	
22,090	50,000	.019333	.001266	.017233	.005166	
22,974	52,000	.022000	.002667	-----------	-----------	
23,858	54,000	.024667	.002667	-----------	-----------	
24,741	56,000	.027500	.002833	-----------	-----------	
25,625	58,000	.030333	.002833	-----------	-----------	
26,508	60,000	.034000	.003667	-----------	-----------	
27,392	62,000	.037933	.003933	-----------	-----------	
28,276	64,000	.042167	.004234	-----------	-----------	
29,160	66,000	.047000	.004833	-----------	-----------	
30,043	68,000	.053000	.006000	-----------	-----------	
30,926	70,000	.060667	.007667	-----------	-----------	
31,810	72,000	.0667	.006033	-----------	-----------	
32,694	74,000	.0767	.0100	-----------	-----------	
33,578	76,000	.1000	.0233	-----------	-----------	
34,461	78,000	.1267	.0267	-----------	-----------	
35,320	79,940	.1767	.0500	-----------	-----------	Tensile strength.

General summary.

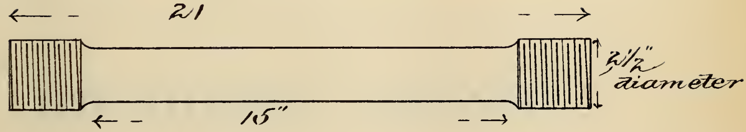
Tensile strength per square inch of original section	pounds..	79,940
Elastic limit per square inch of original section	do...	36,000
Elongation per inch after rupture	inch..	0.2067
Elongation per inch under strain at elastic limit	do...	.001267
Reduction in diameter at point of rupture	do...	.14
Reduction in area after rupture, per centum of original section		33.9
Position of rupture		″.80 from the neck
Character of broken surface		granular, 75 per cent.; silky, 25 per cent.
Elongation of inch sections		″.30*, ″.16, ″.16

BRONZE.

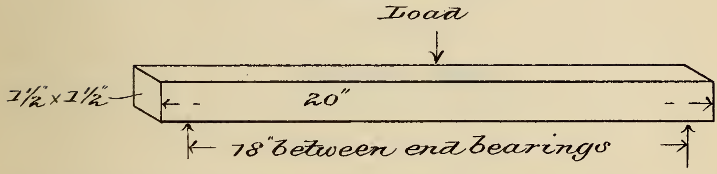
TENSION COMPRESSION AND TRANSVERSE TESTS.

Forms of specimens

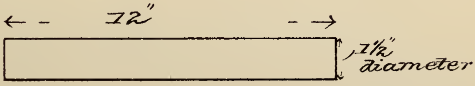
Tension



Transverse



Compression



H Ex 14 51 1

"DEOXIDIZED" BRONZE

AND

BRONZE FROM NAVY-YARDS.

TENSILE TESTS.

DEOXIDIZED BRONZE.

No. 2104.

Mark, 1.
Diameter, 1″.8822.
Sectional area, 2.782 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,857	1,027	0.	0.	Initial load.
5,714	2,054	.0001		
8,571	3,081	.0007		
11,428	4,108	.0014		
14,285	5,135	.0022	—.0003	
17,142	6,162	.0028		
19,999	7,189	.0034		
22,856	8,216	.0041		
25,713	9,243	.0049		
28,570	10,270	.0056	—.0004	
31,427	11,297	.0065		
34,284	12,324	.0074		
37,141	13,351	.0083		
39,998	14,378	.0095		
42,855	15,404	.0109	0.	
45,712	16,431	.0117		Elastic limit.
48,569	17,458	.0135		
51,426	18,485	.0170		
54,283	19,512	.0222		
57,140	20,539	.0297		
59,997	21,566	.0407		
62,854	22,593	.0527		
65,711	23,620	.0680		
68,568	24,647	.0915		
71,425	25,674	.1165		
74,282	26,701	.16		
77,139	27,728	.185		
78,200	28,110			Tensile strength.

Elongation in 15 inches, ″.22 = 1.5 per cent.

Fractured 5″.80 from neck. Appearance, lavender color, with occasional small yellow spots.

Diameter at fracture, 1″.86. Area, 2.717 square inches.

Contraction, 2.3 per cent.

Elongation of inch sections, ″.01, ″.01, ″.01, ″.01, ″.03, ″.01, ″.02, ″.01, ″.01, ″.05, ″.01, ″.01, ″.01, ″.01, ″.01.

DEOXIDIZED BRONZE.

No. 2195.

Marks, 2.
Diameter, 1″.8822.
Sectional area, 2.782 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,857	1,027	0.	0.	Initial load.
5,714	2,054	.0008	....	
8,571	3,081	.0015	....	
11,428	4,108	.0023	....	
14,285	5,135	.0031	0.	
17,142	6,162	.0038	....	
19,999	7,189	.0045	....	
22,856	8,216	.0053	....	
25,713	9,243	.0058	....	
28,570	10,270	.0067	0.	
31,427	11,297	.0075	....	
34,284	12,324	.0082	....	
37,141	13,351	.0090	....	
39,998	14,378	.0100	....	
42,855	15,404	.0110	.0010	Elastic limit.
45,712	16,431	.0126	....	
48,569	17,458	.0145	....	
51,426	18,485	.0169	....	
54,283	19,512	.0207	....	
57,140	20,539	.0270	....	
59,997	21,566	.0318	....	
62,854	22,593	.0395	....	
65,711	23,620	.07	....	
68,568	24,647	.08	....	
71,425	25,674	.10	....	
74,282	26,701	.12	....	
77,139	27,728	.135	....	
79,996	28,755	.17	....	
82,853	29,782	.20	....	
85,710	30,810	....	....	Tensile strength.

Elongation in 15 inches, ″.27 = 1.8 per cent.

Fractured 6″.9 from neck. Appearance, lavender colored, with spongy spot of yellow metal ½″ from circumference.

Diameter at fracture, 1″.85. Area, 2.688 square inches.

Contraction, 3.4 per cent.

Elongation of inch sections, ″.01, ″.01, ″.01, ″.02, ″.02, ″.02, ″.04, ″.03, ″.02, ″.01, ″.02, ″.02, ″.01, ″.02, ″.01.

DEOXIDIZED BRONZE.

No. 2106.

Marks, 3.
Diameter, 1″.883.
Sectional area, 2.785 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2, 785	1, 000	0.	0.	Initial load.
5, 570	2, 000	.0008	....	
8, 355	3, 000	.0016	....	
11, 140	4, 000	.0023	....	
13, 925	5, 000	.0031	—.0003	
16, 710	6, 000	.0038	....	
19, 495	7, 000	.0046	....	
22, 280	8, 000	.0053	....	
25, 065	9, 000	.0061	....	
27, 850	10, 000	.0067	—.0003	
30, 635	11, 000	.0075	....	
33, 420	12, 000	.0084	....	
36, 205	13, 000	.0092	....	
38, 990	14, 000	.0102	....	Elastic limit.
41, 775	15, 000	.0115	.0008	
44, 560	16, 000	.0136	....	
47, 345	17, 000	.0158	....	
50, 130	18, 000	.0187	....	
52, 915	19, 000	.0228	....	
55, 700	20, 000	.0290	....	
58, 485	21, 000	.03	....	
61, 270	22, 000	.04	....	
64, 055	23, 000	.05	....	
66, 840	24, 000	.07	....	
69, 625	25, 000	.08	....	
72, 410	26, 000	.10	....	
75, 195	27, 000	.13	....	
77, 980	28, 000	.16	....	
80, 765	29, 000	....	....	Tensile strength.

Elongation in 15 inches ″.26=1.7 per cent.

Fractured 9″ from neck. Appearance, lavender colored, with spongy spot ¼″ diameter of yellowish green metal, ½″ from the circumference. Other small spots of yellow metal interspersed with the lavender-colored metal.

Diameter at fracture, 1″.86. Area, 2.717 square inches.

Contraction, 2.4 per cent.

Elongation of inch sections, ″.03, ″.02, ″.02, ″.02, ″.01, ″.01, ″.02, ″.01, ″.03, ″.01, ″.01, ″.01, ″.03, ″.01, ″.02.

No. 2106*a*.

Specimen turned down from stem of fractured specimen 3.
Total length, 14″.
Diameter of stem, 1″.129.
Sectional area, 1 square inch.
Tensile strength, 26,920 pounds per square inch.
Elongation in 10 inches, ″.04 = 0.4 per cent.

Appearance of fracture, light-yellow and lavender color; spot of greenish metal near the circumference.

Bronze from Portsmouth Navy-Yard.

No. 2107.

Marks, P_1.
Diameter, 1''.875.
Sectional area, 2.761 square inches.
Gauged length, 10''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,761	1,000	0.	0.	Initial load.
5,522	2,000	.0012	....	
8,283	3,000	.0022	....	
11,044	4,000	.0033	....	
13,805	5,000	.0043	—.0002	
16,566	6,000	.0055	....	
19,327	7,000	.0065	....	
22,088	8,000	.0075	....	
24,849	9,000	.0087	....	
27,610	10,000	.0102	.0005	Elastic limit.
30,371	11,000	.0127	....	
33,132	12,000	.0170	....	
35,893	13,000	.0277	....	
38,654	14,000	.0450	....	
40,600	14,700	....	....	Tensile strength.

Elongation in 15 inches, ''.13 = 0.9 per cent.

Fractured 2''.75 from neck. Appearance, irregular spongy surface, the color varying from lavender to light-yellow and copper color.

Diameter at fracture, 1''.86. Area, 2.717 square inches.

Contraction, 1.6 per cent.

BRONZE FROM PORTSMOUTH NAVY-YARD.

No. 2108.

Marks, P_2.
Diameter, 1″.875.
Sectional area, 2.761 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,761	1,000	0.	0.	Initial load.
5,522	2,000	.0008	....	
8,283	3,000	.0018	....	
11,044	4,000	.0028	....	
13,805	5,000	.0038	0.	
16,566	6,000	.0049	....	
19,327	7,000	.0059	....	
22,088	8,000	.0070	....	
24,849	9,000	.0085	....	Elastic limit.
27,610	10,000	.0103	.0013	
30,371	11,000	.0127	....	
33,132	12,000	.0170	....	
35,893	13,000	.0278	....	
38,654	14,000	.0453	....	
41,415	15,000	....	....	Tensile strength.

Elongation in 15 inches, ″.10 = 0.7 per cent.
Fractured at the neck. Appearance the same as No. 2107.
Diameter at fracture, 1″.86. Area, 2.717 square inches.
Contraction, 1.6 per cent.

No. 2108*a*.

Specimen turned down from stem of fractured specimen P_2.
Total length, 14″.
Diameter of stem, 1″.129.
Sectional area, 1 square inch.
Tensile strength, 16,810 pounds per square inch.
Elongation in 10 inches, ″.09 = 0.9 per cent.

Appearance of fracture varies from light to deep yellow, in places copper-colored and dark purple.

BRONZE FROM NORFOLK NAVY-YARD.

No. 2109.

Marks, N. No. 1.
Diameter, 1″.875.
Sectional area, 2.761 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,761	1,000	0.	0.	Initial load.
5,522	2,000	.0010	....	
8,283	3,000	.0020	....	
11,044	4,000	.0028	....	
13,805	5,000	.0035	—.0001	
16,566	6,000	.0047	....	
19,327	7,000	.0055	....	
22,088	8,000	.0062	....	
24,849	9,000	.0071	....	
27,610	10,000	.0084	.0003	
30,371	11,000	.0098	....	Elastic limit.
33,132	12,000	.0118	....	
35,893	13,000	.0153	....	
38,654	14,000	.0256	....	
41,415	15,000	.0435	....	
44,176	16,000	.08	....	
46,937	17,000	.14	....	
47,200	17,100	....	....	Tensile strength.

Elongation in 15 inches, ″.25 = 1.7 per cent.

Fractured 1″ from neck. Appearance, irregular surface. Color varies, lavender and light yellow predominating. Spots of dark yellow, copper color, and dark purple.

Diameter at fracture, 1″.84. Area, 2.659 square inches.

Contraction, 3.7 per cent.

No. 2109*a*.

Specimen turned down from stem of fractured specimen N. No. 1.
Total length, 14″.
Diameter of stem, 1″.129.
Sectional area, 1 square inch.
Tensile strength, 17,250 pounds per square inch.
Elongation in 10 inches, ″.09 = 0.9 per cent.
Appearance of fracture varies from light to deep yellow, in part lavender and copper colored.

BRONZE FROM NORFOLK NAVY-YARD.

No. 2110.

Marks, N. No. 2.
Diameter, 1″.875.
Sectional area, 2.761 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,761	1,000	0.	0.	Initial load.
5,522	2,000	.0010	....	
8,283	3,000	.0020	....	
11,044	4,000	.0030	....	
13,805	5,000	.0040	.0005	
16,566	6,000	.0050	....	
19,327	7,000	.0055	....	
22,088	8,000	.0068	....	
24,849	9,000	.0078	....	
27,610	10,000	.0089	.0014	Elastic limit.
30,371	11,000	.0107	....	
33,132	12,000	.0129	....	
35,893	13,000	.0168	....	
38,654	14,000	.0245	....	
41,415	15,000	.0405	....	
44,176	16,000	06	....	
46,937	17,000	.085	....	
49,698	18,000	.18	....	Cracks open in stem.
52,459	19,000	.28	....	
55,400	20,070	....	....	Tensile strength.

Elongation in 15 inches, ″.57=3.8 per cent.

Fractured 1″.5 from neck. Appearance similar to No. 2109, but with less dark purple metal in the fractured surface.

Diameter at fracture, 1″.82. Area, 2.602 square inches.

Contraction, 5.8 per cent.

Elongation of inch sections, ″.03, ″.11, ″.04, ″.07, ″.05, ″.04, ″.02, ″.04, ″.03, ″.02, ″.03, ″.03, ″.02, ″.02, ″.02.

BRONZE FROM NEW YORK NAVY-YARD.

No. 2111.

Marks, N.Y.$\overset{\text{Y}}{\underset{1}{\text{N}}}$.Y.
Diameter, 1″.875.
Sectional area, 2.761 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2, 761	1, 000	0.	0.	Initial load.
5, 522	2, 000	.0012	....	
8, 283	3, 000	.0022	....	
11, 044	4, 000	.0032	....	
13, 805	5, 000	.0042	—.0003	
16, 566	6, 000	.0052	....	
19, 327	7, 000	.0062	....	
22, 088	8, 000	.0072	....	
24, 849	9, 000	.0086	....	Elastic limit.
27, 610	10, 000	.0105	.0012	
30, 371	11, 000	.0134	....	
33, 132	12, 000	.0180	....	
35, 893	13, 000	.0297	....	
38, 654	14, 000	.0460	....	
41, 415	15, 000	.08	....	
44, 176	16, 000	.12	....	
46, 937	17, 000	.19	....	
49, 698	18, 000	.29	....	
52, 459	19, 000	.40	....	
54, 900	19, 880	....	....	Tensile strength.

Elongation in 15 inches, ″.69=4.6 per cent.

Fractured at the neck. Appearance, irregular surface; color varies from light to dark yellow, with parts copper colored and parts shading from dark brown to purple and green.

Diameter at fracture, 1″.82. Area, 2.602 square inches.

Contraction, 5.8 per cent.

Elongation of inch sections, ″.11, ″.07, ″.05, ″.04, ″.06, ″.04, ″.05, ″.04, ″.04, ″.03, ″.04, ″.03. ″.05, ″.02, ″.02.

BRONZE FROM NEW YORK NAVY-YARD.

No. 2112.

Marks, N. Y. $\overset{\text{Y}}{\underset{2}{\text{N}}}$. Y.
Diameter, 1″.875.
Sectional area, 2.761 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,761	1,000	0.	0.	Initial load.
5,522	2,000	.0012	....	
8,283	3,000	.0022	....	
11,044	4,000	.0032	....	
13,805	5,000	.0041	—.0004	
16,566	6,000	.0051	....	
19,327	7,000	.0060	....	
22,088	8,000	.0072	....	
24,849	9,000	.0086	....	Elastic limit.
27,610	10,000	.0102	.0015	
30,371	11,000	.0135	....	
33,132	12,000	.0176	....	
35,893	13,000	.0263	....	
38,654	14,000	.0420	....	
41,415	15,000	.0660	....	
44,176	16,000	.1080	....	
46,937	17,000	.19	....	
49,698	18,000	.26	....	
52,459	19,000	.37	....	
53,300	19,300	....	....	Tensile strength.

Elongation in 15 inches, ″.54 = 3.6 per cent.

Fractured at the neck. Appearance similar to No. 2111, except there was no green-colored metal present.

Diameter at fracture, 1″.84. Area, 2.659 square inches.

Contraction, 3.7 per cent.

Elongation of inch sections, ″.08, ″.05, ″.03, ″.04, ″.04, ″.04, ″.03, ″.04, ″.03, ″.04, ″.02, ″.03, ″.03, ″.03, ″.01.

No. 2112*a*.

Specimen turned down from stem of fractured specimen N. Y. N. Y. 2.
Total length, 14″.
Diameter of stem, 1″.129.
Sectional area, 1 square inch.
Tensile strength, 19,760 pounds per square inch.
Elongation in 10 inches, ″.21 = 2.1 per cent.

Appearance of fracture, light yellow 10 per cent., intermingled with 90 per cent copper-colored and lavender material.

TRANSVERSE TESTS.

DEOXIDIZED BRONZE.

No. 42.

Mark, 1.
Breadth, 1″.500.
Depth, 1″.500.
End bearings 18″ apart.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress per square inch.				
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inch.*	
125	1,000	0.	0.	0.	Initial load.
250	2,000	.0030	.0030		
375	3,000	.0062	.0032		
500	4,000	.0097	.0035		
625	5,000	.0126	.0029	0.	
750	6,000	.0158	.0032		
875	7,000	.0190	.0032		
1,000	8,000	.0220	.0030		
1,125	9,000	.0249	.0029		
1,250	10,000	.0279	.0030	−.0002	
1,375	11,000	.0307	.0028		
1,500	12,000	.0338	.0031		
1,625	13,000	.0367	.0029		
1,750	14,000	.0400	.0033		Elastic limit.
1,875	15,000	.0438	.0038	.0015	
2,000	16,000	.0474	.0036		
2,125	17,000	.0517	.0043		
2,250	18,000	.0560	.0043		
2,375	19,000	.0603	.0043		
2,500	20,000	.0652	.0049	.0091	
2,625	21,000	.0702	.0050		
2,750	22,000	.0765	.0063		
2,875	23,000	.0816	.0051		
3,000	24,000	.0883	.0067		
3,125	25,000	.0969	.0086	.0257	
3,250	26,000	.12	.0231		
3,375	27,000	.14	.02		
3,500	28,000	.15	.01		
3,625	29,000	.16	.01		
3,750	30,000	.17	.01		
3,875	31,000	.19	.02		
4,000	32,000	.20	.01		
4,125	33,000	.21	.01		
4,250	34,000	.22	.01		
4,375	35,000	.24	.02		
4,500	36,000	.26	.02		
4,625	37,000	.29	.03		
4,750	38,000	.30	.01		
4,875	39,000	.32	.02		
5,000	40,000	.35	.03		
5,125	41,000	.39	.04		
5,250	42,000	.41	.02		
5,375	43,000	.45	.04		
5,500	44,000	.49	.04		
5,625	45,000	.52	.03		
5,750	46,000	.57	.05		
5,875	47,000	.61	.04		
6,000	48,000	.67	.06		
6,125	49,000	.73	.06		
6,250	50,000	.78	.05		
6,375	51,000	.85	.07		
6,500	52,000	.93	.08		
6,625	53,000	1.00	.07		
6,750	54,000	1.09	.09		
6,875	55,000	1.19	.10		
7,000	56,000	1.29	.10		
7,125	57,000	1.39	.10		
7,250	58,000	1.49	.10		

No. 42—Continued.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress per square inch.				
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inch.*	
7,375	59,000	1.58	.09	....	
7,500	60,000	1.64	.06	....	
7,625	61,000	1.74	.10	....	
7,750	62,000	1.81	.07	....	
7,875	63,000	1.89	.08	....	
8,000	64,000	2.05	.16	....	
8,310	66,480	....	....	....	Ultimate strength.

Bent 28°, then fractured. Appearance, light yellow color; radiated at edges from center.

Specific gravity, 8.4767.

Hardness, 7.11.

DEOXIDIZED BRONZE.

No. 43.

Marks, 2.
Breadth, 1″.500.
Depth, 1″.500.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress per square inch.				
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inch.*	
125	1,000	0.	0.	0.	Initial load.
625	5,000	.0150	.0150	0.	
1,250	10,000	.0328	.0172	0.	
1,375	11,000	.0350	.0022	....	
1,500	12,000	.0400	.0050	....	
1,625	13,000	.0431	.0031	....	
1,750	14,000	.0469	.0038	....	
1,875	15,000	.0502	.0033	.0010	Elastic limit approximate.
2,000	16,000	.0545	.0043	....	
2,125	17,000	.0583	.0038	....	
2,250	18,000	.0622	.0039	....	
2,375	19,000	.0670	.0048	....	
2,500	20,000	.0725	.0055	.0110	
....	....	....	....	.0077	After resting 15 hours under initial load.
2,625	21,000	.0774	.0049	....	
2,750	22,000	.0845	.0071	....	
2,875	23,000	.0907	.0062	....	
3,000	24,000	.1006	.0099	....	
3,125	25,000	.1097	.0091	.0308	
3,250	26,000	.1217	.0120	....	
3,500	28,000	.1510	.0293	....	
3,750	30,000	.1865	.0355	....	
4,000	32,000	.2625	.0760	....	
4,250	34,000	.3173	.0548	....	
4,500	36,000	.4395	.1222	....	
4,750	38,000	.58	.1405	....	
5,000	40,000	.75	.17	....	
5,500	44,000	1.25	.50	....	Cracks on tension side.
5,650	45,200	....	....	....	Ultimate strength.

Bent 22°, then fractured. Appearance, light-yellow color, with lavender cast.

Specific gravity, 8.2027.

Hardness, 4.79.

DEOXIDIZED BRONZE.

No. 44.

Marks, 3.
Breadth, 1″.500.
Depth, 1″.500.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress per square inch.				
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	
125	1,000	0.	0.	0.	Initial load.
625	5,000	.0121	.0121	0.	
1,250	10,000	.0272	.0151	0.	
1,375	11,000	.0299	.0027	....	
1,500	12,000	.0325	.0026	....	
1,625	13,000	.0350	.0025	....	
1,750	14,000	.0383	.0033	....	
1,875	15,000	.0410	.0027	0.	
2,000	16,000	.0440	.0030	....	
2,125	17,000	.0472	.0032	....	
2,250	18,000	.0500	.0028	....	
2,375	19,000	.0532	.0032	....	
2,500	20,000	.0569	.0037	.0010	
2,625	21,000	.0600	.0031	....	Elastic limit.
2,750	22,000	.0644	.0044	....	
2,875	23,000	.0690	.0046	....	
3,000	24,000	.0742	.0052	....	
3,125	25,000	.0794	.0052	....	
3,250	26,000	.0850	.0056	....	
3,500	28,000	.0992	.0142	....	
3,750	30,000	.1170	.0178	....	
4,250	34,000	.1620	.0450	....	
4,750	38,000	.24	.078	....	
5,250	42,000	.32	.08	....	
5,750	46,000	.45	.13	....	
6,250	50,000	.63	.18	....	
6,750	54,000	.87	.24	....	Crack started on the tension side.
7,200	57,600	....	....	....	Ultimate strength.

Bent 14°, then fractured. Appearance, light-yellow color, with lavender cast.

Specific gravity, 8.5317.
Hardness, 7.96.

BRONZE FROM PORTSMOUTH NAVY-YARD.

No. 45.

Marks, P_1.
Breadth, 1''.500.
Depth, 1''.500.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress per square inch.				
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inch.*	
125	1,000	0.	0.	....	Initial load.
250	2,000	.0033	.0033	....	
375	3,000	.0063	.0030	....	
500	4,000	.0099	.0036	....	
625	5,000	.0122	.0023	.0002	
750	6,000	.0160	.0038	....	
875	7,000	.0190	.0030	....	
1,000	8,000	.0222	.0032	....	
1,125	9,000	.0253	.9031	....	
1,250	10,000	.0283	.0030	.0003	
1,375	11,000	.0313	.0030	....	
1,500	12,000	.0347	.0034	....	
1,625	13,000	.0372	.0025	....	
1,750	14,000	.0407	.0035	....	
1,875	15,000	.0440	.0033	.0015	
2,000	16,000	.0476	.0036	....	
2,125	17,000	.0513	.0037	....	
2,250	18,000	.0550	.0037	....	Elastic limit.
2,375	19,000	.0598	.0048	....	
2,500	20,000	.0660	.0062	....	
2,625	21,000	.0720	.0060	....	
2,750	22,000	.0805	.0085	....	
3,000	24,000	.1000	.0195	....	
3,250	26,000	.1355	.0355	....	
3,500	28,000	.1990	.0635	....	
3,750	30,000	.3265	.1275	....	
4,000	32,000	.52	.1935	....	
4,250	34,000	.78	.26	....	
4,500	36,000	1.22	.44	....	
4,540	36,320	....	....	....	Ultimate strength.

Bent 21°, then fractured. Appearance, light-yellow color, with spots of lavender cast.

Specific gravity, 8.4269.
Hardness, 5.06.

BRONZE FROM PORTSMOUTH NAVY-YARD.

No. 46.

Marks, P_2.
Breadth, 1″.500.
Depth, 1″.500.

Applied loads.					
Total.	Maximum fiber stress per square inch.	Deflections.	Successive deflections.	Deflection sets.	Remsrks.
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inch.*	
125	1, 000	0.	0.	0.	Initial load.
625	5, 000	.0140	.0140	....	
750	6, 000	.0175	.0035	....	
875	7, 000	.0210	.0035	....	
1, 000	8, 000	.0248	.0038	....	
1, 125	9, 000	.0280	.0032	....	
1, 250	10, 000	.0315	.0035	.0005	
1, 375	11, 000	.0350	.0035	....	
1, 500	12, 000	.0387	.0037	....	
1, 625	13, 000	.0421	.0034	....	Elastic limit.
1, 750	14, 000	.0462	.0041	....	
1, 875	15, 000	.0500	.0038	.0025	
2, 000	16, 000	.0545	.0045	....	
2, 125	17, 000	.0597	.0052	....	
2, 250	18, 000	.0650	.0053	....	
2, 375	19, 000	.0713	.0063	....	
2, 500	20, 000	.0793	.0080	.0153	
2, 750	22, 000	.0999	.0206	....	
3, 000	24, 000	.1310	.0311	....	
3, 250	26, 000	.1885	.0575	....	
3, 500	28, 000	.2750	.0865	....	
3, 750	30, 000	.4000	.1250	....	
4, 000	32, 000	.61	.21	....	
4, 250	34, 000	.86	.27	....	
4, 500	36, 000	1.19	.33	....	
4, 750	38, 000	1.49	.30	....	
5, 000	40, 000	1.89	.40	....	
5, 250	42, 000	2.32	.43	....	
5, 380	43, 040	....	....	....	Ultimate strength.

Bent 34°, then fractured. Appearance, light-yellow color, with darker yellow cast in places.

Specific gravity, 8.1449.

Hardness, 3.33+

BRONZE FROM NORFOLK NAVY-YARD.

No. 47.

Marks, N. No. 1.
Breadth, 1''.500.
Depth, 1''.500.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress per square inch.				
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inch.*	
125	1,000	0.	0.	0.	Initial load.
250	2,000	.0031	.0031	....	
375	3,000	.0062	.0031	....	
500	4,000	.0090	.0028	....	
625	5,000	.0119	.0029	.0001	
750	6,000	.0153	.0034	....	
875	7,000	.0181	.0028	....	
1,000	8,000	.0202	.0021	....	
1,125	9,000	.0240	.0038	....	
1,250	10,000	.0262	.0022	.0002	
1,375	11,000	.0298	.0036	....	
1,500	12,000	.0322	.0024	....	
1,625	13,000	.0350	.0028	....	
1,750	14,000	.0380	.0030	....	
1,875	15,000	.0408	.0028	.0002	
2,000	16,000	.0436	.0028	....	
2,125	17,000	.0464	.0028	....	
2,250	18,000	.0493	.0029	....	Elastic limit approximate.
2,375	19,000	.0529	.0036	....	
2,500	20,000	.0565	.0036	.0037	
2,625	21,000	.0610	.0045	....	
2,750	22,000	.0658	.0048	....	
2,875	23,000	.0706	.0048	....	
3,000	24,000	.0777	.0071	....	
3,125	25,000	.0848	.0071	.0164	
3,250	26,000	.0962	.0114	....	
3,500	28,000	.1204	.0242	....	
3,750	30,000	.1679	.0475	....	
4,000	32,000	.2462	.0783	....	
4,250	34,000	.3540	.1078	....	
4,500	36,000	.49	.1360	....	
4,750	38,000	.73	.24	....	
5,000	40,000	.95	.22	....	
5,250	42,000	1.25	.30	....	
5,500	44,000	1.54	.29	....	
5,750	46,000	1.89	.35	....	
6,000	48,000	2.31	.42	....	
6,250	50,000	2.74	.43	....	
6,500	52,000	3.16	.42	....	
6,750	54,000	....	....	....	Bar drew off one end bearing. Bent 53°.
End bearings now set 15'' apart.					
8,180	....	....	....	....	Ultimate strength.

Bent 59°, then fractured. Appearance, light-yellow color, with lavender cast in places.

Specific gravity, 8.6150.

Hardness, 5.04.

BRONZE FROM NORFOLK NAVY-YARD.

No. 48.

Marks, N. No. 2.
Breadth, 1″.500.
Depth, 1″.500.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress per square inch.				
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inch.*	
125	1,000	0.	0.	0.	Initial load.
625	5,000	.0120	.0120	0.	
1,250	10,000	.0212	.0092	0.	
1,875	15,000	.0415	.0103	0.	
2,000	16,000	.0450	.0035	....	
2,125	17,000	.0480	.0030	....	
2,250	18,000	.0510	.0030	....	
2,375	19,000	.0539	.0029	....	Elastic limit.
2,500	20,000	.0589	.0050	.0039	
2,625	21,000	.0638	.0049	....	
2,750	22,000	.0690	.0052	....	
2,875	23,000	.0745	.0055	....	
3,000	24,000	.0800	.0055	....	
3,125	25,000	.0895	.0095	....	
3,250	26,000	.0990	.0095	....	
3,500	28,000	.1270	.0280	....	
3,750	30,000	.1790	.0520	....	
4,000	32,000	.2620	.0830	....	
4,250	34,000	.41	.1490	....	
4,500	36,000	.60	.19	....	
4,750	38,000	.84	.24	....	
5,000	40,000	1.16	.32	....	
5,250	42,000	1.45	.29	....	
5,500	44,000	1.75	.30	....	
5,750	46,000	2.22	.47	....	
6,000	48,000	2.86	.64	....	
6,250	50,000	3.53	.67	....	Bar was within ⅛″ of drawing off one end bearing. Bent 48°.
End bearings now set 15″ apart.					
7,860	....	....	....	....	Ultimate strength.

Bent 64°, then fractured. Appearance, light-yellow color, shading into darker yellow.

Specific gravity, 8.5716.

Hardness, 4.94.

BRONZE FROM NEW YORK NAVY-YARD.

No. 49.

Marks, $\text{N. Y.}\,{}^{\text{Y}}_{1}\,\text{N. Y.}$
Breadth, 1″.500.
Depth, 1″.500.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress per square inch.				
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inch.*	
125	1,000	0.	0.	0.	Initial load.
250	2,000	.0040	.0040	....	
375	3,000	.0060	.0020	....	
500	4,000	.0093	.0033	....	
625	5,000	.0122	.0029	0.	
750	6,000	.0147	.0025	....	
875	7,000	.0177	.0030	....	
1,000	8,000	.0205	.0028	....	
1,125	9,000	.0235	.0030	....	
1,250	10,000	.0269	.0034	.0010	
1,375	11,000	.0292	.0023	....	Elastic limit approximate.
1,500	12,000	.0328	.0036	....	
1,625	13,000	.0359	.0031	....	
1,750	14,000	.0385	.0026	....	
1,875	15,000	.0420	.0035	.0024	
2,000	16,000	.0455	.0035	....	
2,125	17,000	.0493	.0038	....	
2,250	18,000	.0530	.0037	....	
2,375	19,000	.0577	.0047	....	
2,500	20,000	.0613	.0036	.0090	
2,625	21,000	.0660	.0047	....	
2,750	22,000	.0720	.0060	....	
2,875	23,000	.0780	.0060	....	
3,000	24,000	.0852	.0072	....	
3,125	25,000	.0940	.0088	.0278	
3,250	26,000	.1038	.0098	....	
3,500	28,000	.1290	.0252	....	
3,750	30,000	.1670	.0380	....	
4,000	32,000	.2172	.0502	....	
4,250	34,000	.30	.0828	....	
4,500	36,000	.41	.11	....	
4,750	38,000	.60	.19	....	
5,000	40,000	.81	.21	....	
5,250	42,000	1.10	.29	....	
5,500	44,000	1.37	.27	....	
5,750	46,000	1.64	.27	....	
6,000	48,000	2.17	.53	....	
6,250	50,000	2.61	.44	....	
6,500	52,000	3.30	.69	....	
6,750	54,000	....	....	....	Bar was within $\frac{1}{8}$″ of drawing off one end bearing. Bent 52°.
End bearings now set 15″ apart.					
8,600	....	....	....	....	Ultimate strength.

Bent 76°, then fractured. Appearance, light-yellow color; edges have lavender cast.

Specific gravity, 8.3389.
Hardness, 4.86.

BRONZE FROM NEW YORK NAVY-YARD.

No. 50.

Marks, N. Y. $\overset{Y}{\underset{2}{N}}$. Y.
Breadth, 1″.500.
Depth, 1″.500.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress per square inch.				
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inch.*	
125	1, 000	0.	0.	0.	Initial load.
625	5, 000	. 0126	. 0126	. 0003	
1, 250	10, 000	. 0281	. 0155	. 0011	
1, 375	11, 000	. 0310	. 0029	....	
1, 500	12, 000	. 0345	. 0035	....	
1, 625	13, 000	. 0379	. 0034	....	
1, 750	14, 000	. 0412	. 0033	....	Elastic limit.
1, 875	15, 000	. 0450	. 0038	. 0040	
2, 000	16, 000	. 0490	. 0040	....	
2, 125	17, 000	. 0525	. 0035	....	
2, 250	18, 000	. 0572	. 0047	....	
2, 375	19, 000	. 0620	. 0048	....	
2, 500	20, 000	. 0688	. 0068	. 0131	
2, 750	22, 000	. 0816	. 0128	....	
3, 000	24, 000	. 0970	. 0154	....	
3, 250	26, 000	. 1208	. 0238	....	
3, 500	28, 000	. 1530	. 0322	....	
3, 750	30, 000	. 2080	. 0550	. 1212	
Load released, bar turned, reversing the stresses; the tension side now becoming the compression side of the bend. Micrometer reset at zero for deflections.					
125	1, 000	0.	0.	0.	Initial load.
250	2, 000	. 0047	. 0047	....	
375	3, 000	. 0097	. 0050	....	
500	4, 000	. 0151	. 0054	....	
625	5, 000	. 0201	. 0050	. 0055	
750	6, 000	. 0260	. 0059	....	
875	7, 000	. 0320	. 0060	....	
1, 000	8, 000	. 0379	. 0059	....	
1, 125	9, 000	. 0431	. 0052	....	
1, 250	10, 000	. 0500	. 0069	. 0183	
1, 375	11, 000	. 0553	. 0053	....	
1, 500	12, 000	. 0620	. 0067	....	
1, 625	13, 000	. 0690	. 0070	....	
1, 750	14, 000	. 0750	. 0060	....	
1, 875	15, 000	. 0820	. 0070	. 0351	
2, 000	16, 000	. 0897	. 0077	....	
2, 125	17, 000	. 0976	. 0079	....	
2, 250	18, 000	. 1039	. 0063	....	
2, 375	19, 000	. 1125	. 0086	....	
2, 500	20, 000	. 1220	. 0095	. 0615	
2, 625	21, 000	. 1299	. 0079	....	
2, 750	22, 000	. 1390	. 0091	....	
2, 875	23, 000	. 1502	. 0112	....	
3, 000	24, 000	. 1642	. 0140	....	Rested ½ hour.
3, 125	25, 000	. 1825	. 0183	....	
3, 250	26, 000	. 1940	. 0115	....	
3, 500	28, 000	. 2300	. 0360	....	
3, 750	30, 000	. 28	. 05	....	
4, 000	32. 000	. 34	. 06	....	
4, 250	34, 000	. 45	. 11	....	
4, 500	36, 000	. 59	. 14	....	
4, 750	38, 000	. 80	. 21	....	
5, 000	40, 000	1. 07	. 27	....	
5, 250	42, 000	1. 38	. 31	....	
5, 500	44, 000	1. 75	. 37	....	
5, 750	46, 000	2. 06	. 31	....	
6, 000	48, 000	2. 67	. 61	....	Ultimate strength.

Bent 39°, then fractured. Appearance, light-yellow color; edges have lavender hue.

Specific gravity, 8.4691.

Hardness, 4.36.

COMPRESSION TESTS.

DEOXIDIZED BRONZE.

No. 764.

Mark, 1.
Length, 12″.
Diameter, 1″.506.
Sectional area, 1.781 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1,781	1,000	0.	0.	Initial load.
8,905	5,000	.0027	0.	
17,810	10,000	.0062	0.	
19,591	11,000	.0070	....	
21,372	12,000	.0078	....	
23,153	13,000	.0086	....	
24,934	14,000	.0095	....	Elastic limit.
26,715	15,000	.0107	.0010	
28,496	16,000	.0122	....	
30,277	17,000	.0140	....	
32,058	18,000	.0165	....	
33,839	19,000	.0200	....	
35,620	20,000	.0250	.0117	
37,401	21,000	.0317	....	
39,182	22,000	.0394	....	
40,963	23,000	.0507	....	
42,744	24,000	.0615	....	
44,525	25,000	.0746	....	
60,800	34,140	....	....	Ultimate strength.

Failed by triple flexure.

Middle deflection, 1″.04. Bar fractured. Appearance of fracture, uniform light-yellow and lavender color.

DEOXIDIZED BRONZE.

No. 765.

Marks, 2.
Length, 12″.
Diameter, 1″.506.
Sectional area, 1.781 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1, 781	1, 000	0.	0.	Initial load.
8, 905	5, 000	.0028	.0001	
17, 810	10, 000	.0061	.0002	
19, 591	11, 000	.0068	....	
21, 372	12, 000	.0074	....	
23, 153	13, 000	.0083	....	
24, 934	14, 000	.0090	....	
26, 715	15, 000	.0099	.0008	
28, 496	16, 000	.0108	....	Elastic limit.
30, 277	17, 000	.0124	....	
32, 058	18, 000	.0139	....	
33, 839	19, 000	.0168	....	
35, 620	20, 000	.0199	.0074	
37, 401	21, 000	.0259	....	
39, 182	22, 000	.0329	....	
40, 963	23, 000	.0413	....	
42, 744	24, 000	.0525	....	
44, 525	25, 000	.0635	....	
59, 150	33, 210	....	....	Ultimate strength.

Failed by triple flexure. Bar fractured when middle deflection reached 1″.20.

Appearance of fracture, uniform light-yellowish lavender color.

DEOXIDIZED BRONZE.

No. 766.

Marks, 3.
Length, 12″.
Diameter, 1″.506.
Sectional area, 1.781 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1, 781	1, 000	0.	0.	Initial load.
8, 905	5, 000	.0028	0.	
17, 810	10, 000	.0065	.0003	
19, 591	11, 000	.0070	....	
21, 372	12, 000	.0079	....	
23, 153	13, 000	.0086	....	
24, 934	14, 000	.0095	....	
26, 715	15, 000	.0105	.0010	
28, 496	16, 000	.0118	....	
30, 277	17, 000	.0130	....	Elastic limit.
32, 058	18, 000	.0150	....	
33, 839	19, 000	.0183	....	
35, 620	20, 000	.0220	.0090	
37, 401	21, 000	.0282	....	
39, 182	22, 000	.0355	....	
42, 744	24, 000	.0540	....	
44, 525	25, 000	.0680	....	
60, 920	34, 210	....	....	Ultimate strength.

Failed by triple flexure. Bar fractured when middle deflection reached 1″.14.

Appearance of fracture, light-yellowish lavender color.

BRONZE FROM PORTSMOUTH NAVY-YARD.

No. 767.

Marks, P_1.
Length, 12″.
Diameter, 1″.503.
Sectional area, 1.774 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1,774	1,000	0.	0.	Initial load.
3,548	2,000	.0009	....	
5,322	3,000	.0018	....	
7,096	4,000	.0028	....	
8,870	5,000	.0036	.0003	
10,644	6,000	.0044	....	
12,418	7,000	.0054	....	
14,192	8,000	.0062	....	
15,966	9,000	.0072	....	
17,740	10,000	.0083	.0010	Elastic limit.
19,514	11,000	.0098	....	
21,288	12,000	.0121	....	
23,062	13,000	.0163	....	
24,836	14,000	.0243	....	
26,610	15,000	.0423	.0310	
28,384	16,000	.0668	....	
30,158	17,000	.1003	....	
34,780	19,610	....	....	Ultimate strength.

Failed by triple flexure. Bar fractured when middle deflection reached 2″.35.

Appearance of fracture varies from light to deep yellow, with lavender cast in places.

BRONZE FROM PORTSMOUTH NAVY-YARD.

No. 768.

Marks, P_2.
Length, 12″.
Diameter, 1″.503.
Sectional area, 1.774 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1, 774	1, 000	0.	0.	Initial load.
8, 870	5, 000	. 0037	. 0002	
10, 644	6, 000	. 0046	....	
12, 418	7, 000	. 0056	....	
14, 192	8, 000	. 0065	....	
15, 966	9, 000	. 0075	....	
17, 740	10, 000	. 0086	. 0007	Elastic limit.
19, 514	11, 000	. 0100	....	
21, 288	12, 000	. 0121	....	
23, 062	13, 000	. 0151	....	
24, 836	14, 000	. 0262	....	
26, 610	15, 000	. 0320	. 0199	
28, 384	16, 000	. 0560	....	
30, 158	17, 000	. 0820	....	
36, 700	20, 690	....	....	Ultimate strength.

Failed by triple flexure. Bar fractured when middle deflection reached 1″.9.

Appearance of fracture varies from light to deep yellow, with lavender cast.

BRONZE FROM NORFOLK NAVY-YARD.

No. 769.

Marks, N. No. 1.
Length, 12″.
Diameter, 1″.500.
Sectional area, 1.767 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1, 767	1, 000	0.	0.	Initial load.
8, 835	5, 000	.0029	....	
10, 602	6, 000	.0035	....	
12, 369	7, 000	.0046	....	
14, 136	8, 000	.0052	....	
15, 903	9, 000	.0062	....	
17, 670	10, 000	.0070	.0001	
19, 437	11, 000	.0078	....	
21, 204	12, 000	.0088	....	
22, 971	13, 000	.0101	....	Elastic limit.
24, 738	14, 000	.0119	....	
26, 505	15, 000	.0151	.0043	
28, 272	16, 000	.0213	....	
30, 039	17, 000	.0361	....	
31, 806	18, 000	.0496	.0366	
33, 573	19, 000	.0671	....	
35, 340	20, 000	.0982	....	
40, 800	23, 090	....	....	Ultimate strength.

Failed by triple flexure. Bar fractured when middle deflection reached 3″.35.

Appearance of fracture varies from light to deep yellow, with lavender cast.

BRONZE FROM NORFOLK NAVY-YARD.

No. 770.

Marks, N. No. 2.
Length, 12″.
Diameter, 1″.500.
Sectional area, 1.767 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1,767	1,000	0.	0.	Initial load.
8,835	5,000	.0027	0.	
10,602	6,000	.0035	....	
12,369	7,000	.0042	....	
14,136	8,000	.0050	....	
15,903	9,000	.0058	....	
17,670	10,000	.0065	0.	
19,437	11,000	.0075	....	
21,204	12,000	.0086	....	
22,971	13,000	.0098	....	Elastic limit.
24,738	14,000	.0120	....	
26,505	15,000	.0160	.0055	
28,272	16,000	.0245	....	
30,039	17,000	.0310	....	
31,806	18,000	.0627	....	
40,300	22,810	....	....	Ultimate strength.

Failed by triple flexure. Bar fractured when middle deflection reached 2″.65.

Appearance of fracture the same as No. 769.

Bronze from New York Navy-Yard.

No. 771.

Marks, N.Y., $\overset{\text{Y}}{\underset{1}{\text{N.Y.}}}$
Length, 12″.
Diameter, 1″.500.
Sectional area, 1.767 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1, 767	1, 000	0.	0.	Initial load.
8, 835	5, 000	.0032	0.	
10, 602	6, 000	.0042	....	
12, 369	7, 000	.0050	....	
14, 136	8, 000	.0060	....	
15, 903	9, 000	.0070	....	
17, 670	10, 000	.0080	.0007	Elastic limit.
19, 437	11, 000	.0095	....	
21, 204	12, 000	.0117	....	
22, 971	13, 000	.0167	....	
24, 738	14, 000	.0232	....	
26, 505	15, 000	.0425	....	
28, 272	16, 000	.0680	....	
30, 039	17, 000	.0940	....	
36, 160	20, 460	....	....	Ultimate strength.

Failed by triple flexure. Bar fractured when middle deflection reached 3″.

Appearance of fracture varies from light to deep yellow; lavender color at circumference.

BRONZE FROM NEW YORK NAVY-YARD.

No. 772.

Marks, N. Y., $\overset{\text{Y}}{\underset{2}{\text{N}}}$. Y.
Length, 12″.
Diameter, 1″.500.
Sectional area, 1.767 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1,767	1,000	0.	0.	Initial load.
8,835	5,000	.0032	....	
10,602	6,000	.0042	....	
12,369	7,000	.0052	....	
14,136	8,000	.0061	....	
15,903	9,000	.0070	....	
17,670	10,000	.0082	.0008	Elastic limit.
19,437	11,000	.0100	....	
21,204	12,000	.0125	....	
22,971	13,000	.0167	....	
24,738	14,000	.0260	....	
26,505	15,000	.0415	....	
28,272	16,000	.0677	....	
30,039	17,000	.0960	....	
36,300	20,540	....	....	Ultimate strength.

Failed by triple flexure. Bar fractured 1″ eccentric when middle deflection reached 2″.35.

Appearance of fracture the same as No. 771.

ALUMINUM BRONZE

FROM

CASTINGS FOR PROPELLER FOR U. S. GUN-BOAT NO. 2.

ALUMINUM BRONZE POURED FROM SAME HEAT OF METAL USED IN PROPELLER FOR GUN-BOAT No. 2.

CAST IN DRY SAND BY THE SOUTH BOSTON IRON-WORKS.

No. 2456.

Tensile Test.

Diameter, 1″.92.
Sectional area, 2.895 square inches.
Gauged length 10″.
Stem of specimen not dressed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,895	1,000	0.	0.	Initial load.
14,475	5,000	.0031	.0006	
28,950	10,000	.0075	.0010	
43,425	15,000	.0129	.0023	
46,320	16,000	.0157	....	
49,215	17,000	.0193	....	Elastic limit (not well defined).
52,110	18,000	.0251	....	
55,005	19,000	.0323	....	
57,900	20,000	.0442	.0275	
60,795	21,000	.0577	....	
63,690	22,000	.0737	....	
66,585	23,000	.0927	.0688	
69,480	24,000	.12	....	
72,375	25,000	.16	....	
75,270	26,000	.18	....	
81,060	28,000	.22	....	
86,850	30,000	.295	....	
92,646	32,000	.36	....	
98,430	34,000	.43	....	
104,220	36,000	.53	....	
110,010	38,000	.63	....	
115,400	39,860	....	....	Tensile strength.

Elongation in 15 inches, 1″.00 = 6.7 per cent.

Elongation of inch sections: ″.08, ″.04, ″.07, ″.04, ″.10, ″.15*, ″.06, ″.07, ″.04, ″.09, ″.04, ″.04, ″.07, ″.06, ″.05.

Diameter at fracture, 1″.82; area, 2.602 square inches.

Contraction, 10.1 per cent.

Fractured 5″.6 from the neck; appearance, light yellow spots in metal of yellowish lavender color; porous.

Around about 2″ of circumference and extending to a maximum depth of ″.20, there was a section of purple-colored metal, apparently colored by the wash of the mold in which cast. Surface cracks developed in stem.

No. 51.

TRANSVERSE TEST.

Length, 20$\frac{3}{16}$″.
Cross-section dimensions, 1″.50 × 1″.50.
End bearings, 18″ apart.
Loaded at the middle.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress.				
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	
125	1,000	0.	0.	0.	Initial load.
625	5,000	.0113	.0113	0.	
1,250	10,000	.0270	.0157	0.	
1,875	15,000	.0412	.0142	.0007	
2,000	16,000	.0444	.0032	....	
2,125	17,000	.0477	.0033	....	
2,250	18,000	.0517	.0040	....	
2,375	19,900	.0551	.0034	....	
2,500	20,000	.0590	.0039	.0030	
2,625	21,000	.0622	.0032	....	Elastic limit.
2,750	22,000	.0670	.0048	....	
2,875	23,000	.0720	.0050	....	
3,000	24,000	.0772	.0052	....	
3,125	25,000	.0830	.0058	.0118	
3,250	26,000	.0889	.0059	....	
3,375	27,000	.0962	.0073	....	
3,500	28,000	.1047	.0085	....	
3,625	29,000	.1144	.0097	....	
3,750	30,000	.1250	.0106	.0368	
4,000	32,000	.1442	.0192	....	
4,250	34,000	.1797	.0355	....	
4,500	36,000	.2187	.0390	....	
4,750	38,000	.2735	.0548	....	
5,000	40,000	.3393	.0658	....	
5,250	42,000	.4121	.0728	....	
5,500	44,000	.5101	.0980	....	
5,750	46,000	.62	.1099	....	
6,000	48,000	.75	.13	....	
6,250	50,000	.90	.15	....	
6,500	52,000	1.08	.18	....	
6,750	54,000	1.24	.16	....	
7,000	56,000	1.41	.17	....	
7,250	58,000	1.59	.18	....	
7,500	60,000	1.73	.14	....	
7,750	62,000	1.88	.15	....	
8,000	64,000	2.21	.33	....	
8,250	66,000	2.56	.35	....	
8,500	68,000	3.27	.71	....	
8,620	68,960	....	....	....	Drew off end bearings.

End bearings now set 15″ apart.
Bar bent 57°, then fractured.
Deflection after fracture, 3″.82; measured on chord of 18″.
Appearance of fracture, pale lavender color, containing light-yellow spots; porous.
Surface cracks developed on the tension side of bar.
Maximum fiber stress not computed at time of fracture on account of change in distance between end bearings.

SAMPLE OF METAL CAST AT SAME TIME SECOND PROPELLER WAS CAST FOR GUN-BOAT NO. 2.

No. 52.

CAST IN DAY SAND ON END.

TRANSVERSE TEST.

Specimen dressed all over.
Length, 20″.10.
Cross-section dimensions, 1″.50 × 1″.50.
End bearings 18″ apart.
Loaded at the middle.

Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress.				
Pounds.	*Pounds.*	*Inches.*	*Inch.*	*Inch.*	
125	1,000	0.	0.	0.	Initial load.
625	5,000	.0100	.0100	0.	
1,250	10,000	.0219	.0119	0.	
1,875	15,000	.0339	.0120	0.	
2,000	16,000	.0351	.0012	....	
2,125	17,000	.0369	.0018	....	
2,250	18,000	.0399	.0030	....	
2,375	19,000	.0434	.0035	....	
2,500	20,000	.0460	.0026	.0008	
2,625	21,000	.0487	.0027	....	
2,750	22,000	.0504	.0017	....	
2,875	23,000	.0532	.0028	....	
3,000	24,000	.0559	.0027	....	
3,125	25,000	.0586	.0027	.0022	
3,250	26,000	.0619	.0033	....	
3,375	27,000	.0671	.0052	....	
3,500	28,000	.0693	.0022	....	
3,625	29,000	.0734	.0041	....	
3,750	30,000	.0786	.0052	.0102	
3,875	31,000	.0824	.0038	....	
4,000	32,000	.0890	.0066	....	
4,125	33,000	.0950	.0060	....	
4,250	34,000	.1012	.0062	....	
4,375	35,000	.1091	.0079	.0267	
4,500	36,000	.1169	.0078	....	
4,750	38,000	.1440	.0271	....	
5,000	40,000	.1740	.0300	....	
5,250	42,000	.2108	.0368	....	
5,500	44,000	.2590	.0482	....	
5,750	46,000	.3140	.0550	....	
6,000	48,000	.3780	.0640	....	
6,250	50,000	.4590	.0810	....	
6,500	52,000	.56	.101	....	
6,750	54,000	.66	.10	....	
7,000	56,000	.77	.11	....	
7,250	58,000	.90	.13	....	
7,500	60,000	1.02	.12	....	
7,750	62,000	1.18	.16	....	
8,000	64,000	1.31	.13	....	
8,250	66,000	1.43	.12	....	
8,500	68,000	1.55	.12	....	
8,750	70,000	1.68	.13	....	
9,000	72,000	1.80	.12	....	
9,250	74,000	2.02	.22	....	
9,500	76,000	2.22	.20	....	
9,750	78,000	2.45	.23	....	
10,000	80,000	2.87	.42	....	
10,250	82,000	3.25	.38	....	
10,600	84,800	....	....	....	Drew off end bearings.
End bearings now set 15″ apart.					
13,100	....	....	....	....	Maximum resistance after changing end bearings.

Bent 57½°, then fractured.

Appearance of fracture, in part yellow with lavendar cast, in part light yellow; porous.

Surface of bar contains numerous small blow holes, which did not dress out in finishing to size.

Hardness taken on ends of transverse bar .... { 8.71
9.08

FROM CASTING FOR THIRD PROPELLER FOR GUN-BOAT NO. 2.

CAST AT THE COLUMBIAN IRON WORKS AND DRY DOCK COMPANY OF BALTIMORE CITY.

Stems of specimens not dressed.
Ends threaded.
Length of stems, 15″.

No. 2615.

Diameter, 1″.93.
Sectional area, 2.93 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2, 930	1, 000	0.	0.	Initial load.
14, 650	5, 000	. 0041	. 0002	
29, 300	10, 000	. 0100	. 0012	
32, 230	11, 000	. 0113	....	
35, 160	12, 000	. 0130	....	
38, 090	13, 000	. 0150	....	
41, 020	14, 000	. 0170	....	
43,950	15, 000	. 0189	. 0058	
46, 880	16, 000	. 0218	....	
49, 810	17, 000	. 0268	....	
52, 740	18, 000	. 0318	....	
55, 670	19, 000	....	....	Tensile strength.

Fractured 1″ from the middle of the stem.

Forty-five per cent. of fractured surface contains a black powder, thought to be foundry facing; 55 per cent of surface light yellow interspersed with lavender-colored metal.

No. 2616.

Diameter, 1″.92.
Sectional area, 2.90 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,900	1,000	0.	0.	Initial load.
14,500	5,000	.0034	.0002	
29,000	10,000	.0079	.6005	
31,900	11,000	.0090	....	
34,800	12,000	.0100	....	
37,700	13,000	.0115	....	
40,600	14,000	.0125	....	
43,500	15,000	.0145	.0025	
46,400	16,000	.0160	....	
49,300	17,000	.0180	....	
52,200	18,000	.0210	....	
55,100	19,000	.0240	....	
58,000	20,000	.0262	.0090	
60,900	21,000	.0292	....	
63,800	22,000	.0337	....	No well defined elastic limit.
66,700	23,000	.0365	....	
69,600	24,000	.0408	....	
72,500	25,000	.0450	.0195	
75,400	26,000	.0487	....	
78,300	27,000	.0545	....	
81,200	28,000	.0608	....	
84,100	29,000	.0680	....	
87,000	30,000	.1050	.0680	
92,800	32,000	.11	....	
98,600	34,000	.13	....	
103,200	35,590	....	....	Tensile strength.
0	0	.19	....	=1.9 per cent.

Fractured 1″ from the neck. Appearance varies from golden brown to lavender color and light yellow. Porous around 1¼″ of circumference.

Contraction of area inappreciable on the rough bar.

Elongation of inch sections: ″.01, ″.01, ″.00, ″.01, ″.00, ″.00, ″.01, ″.01, ″.01, ″.01, ″.01, ″.01, ″.02, ″.01, ″.07*.

No. 2617.

Diameter, ″.753.
Sectional area, .445 square inch.
Specimen dressed all over.
Tensile strength, 10.060 lbs. = 22.610 lbs. per square inch.
Fractured at a spongy spot in the metal 1¾″ from the neck.

Appearance, 45 per cent. dark colored, spongy; 55 per cent. light yellow, with lavender cast.

There was a cavity near the center of the bar, about ″.08 × ″.15 in cross-section.

Micrometer observations omitted on account of the defects visible on the surface of the stem before testing.

SPECIMENS CAST AND TESTED WITHOUT MACHINE FINISH EXCEPT THREADING.

No. 2618.

Marks, P. B.
Diameter, 1″.99.
Sectional area, 3.11 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds,*	*Inch.*	*Inch.*	
3, 110	1, 000	0.	0.	Initial load.
15, 550	5, 000	.0035	0.	
31, 100	10, 000	.0083	.0003	
34, 210	11, 000	.0093	....	
37, 320	12, 000	.0104	....	
40, 430	13, 000	.0120	....	
43, 540	14, 000	.0135	....	Elastic limit.
46, 650	15, 000	.0162	.0031	
49, 760	16, 000	.0188	....	
52, 870	17, 000	.0216	....	
55, 980	18, 000	.0251	....	
59, 090	19, 000	.0288	....	
62, 200	20, 000	.0333	.0123	
65, 310	21, 000	.0361	....	
68, 420	22, 000	.0413	....	
71, 530	23, 000	.0471	....	
74, 640	24, 000	.0531	....	
77, 750	25, 000	.0598	.0296	
80, 860	26, 000	.07	....	
87, 080	28, 000	.09	....	
93, 300	30, 000	.12	....	
95, 900	30. 840	....	....	Tensile strength.

Elongation in 15 inches ″.11=00.7 per cent.
Contraction of area indeterminate on rough bar.
Fractured at the neck. Appearance, golden yellow, interspersed with lavender-colored metal. Ring of lavender-colored metal at the circumference.

No. 2619.

Marks, P. A.
Diameter, 1″.98.
Sectional area, 3.08 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,080	1,000	0.	0.	Initial load.
15,400	5,000	.0033	—.0002	
30,800	10,000	.0097	.0003	
33,880	11,000	.0102	....	
36,960	12,000	.0118	....	
40,040	13,000	.0139	....	
43,120	14,000	.0161	....	Elastic limit.
46,200	15,000	.0191	.0042	
49,280	16,000	.0217	....	
52,360	17,000	.0250	....	
55,440	18,000	.0286	....	
58,520	19,000	.0331	....	
61,600	20,000	.0374	.0148	
64,680	21,000	.0413	....	
67,760	22,000	.0471	....	
70,840	23,000	.0531	....	
73,920	24,000	.0591	....	
77,000	25,000	.0671	.0359	
80,080	26,000	.08	....	
86,240	28,000	.10	....	
92,200	29,940	....	....	Tensile strength.

Elongation in 15 inches, ″.09 = 00.6 per cent.

Fractured at the neck; appearance golden yellow, dark brownish and lavender-colored metal interspersed.

BRONZE FROM CONSOLE BREECH MECHANISM—SEA-COAST GUN.

No. 3696.

Marks, 1.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
500	2, 000	. 000067	. 000067	....	....	
750	3, 000	. 000233	. 000166	....	....	
1, 000	4, 000	. 000300	. 000067	....	....	
1, 250	5, 000	. 000367	. 000067	. 000033	. 000033	
1, 500	6, 000	. 000500	. 000133	....	....	
1, 750	7, 000	. 000600	. 000100	....	....	
2, 000	8, 000	. 000733	. 000133	....	....	Elastic limit.
2, 250	9, 000	. 000933	. 000200	....	....	
2, 500	10, 000	. 001400	. 000467	. 000600	. 000567	
2, 750	11, 000	. 001667	. 000267	....	....	
3, 000	12, 000	. 003267	. 001600	....	....	
3, 250	13, 000	. 005500	. 002233	....	....	
3, 500	14, 000	. 012000	. 006500	....	....	
3, 750	15, 000	. 016333	. 004333	....	....	
4, 000	16, 000	. 027667	. 011334	....	....	
4, 250	17, 000	. 0350	. 007333	....	....	
4, 500	18, 000	. 0533	. 0183	....	....	
4, 750	19, 000	. 0633	. 0100	....	....	
4, 980	19, 920	....	....	....	....	Tensile strength.

General summary.

Specific gravity		8. 1514
Hardness		3. 33—
Tensile strength per square inch of original section	pounds	19, 920
Elastic limit per square inch of original section	do	8, 000
Elongation per inch after rupture	inch	0. 1000
Elongation per inch under strain at elastic limit	do	. 000733
Reduction in diameter at point of rupture	do	. 034
Reduction in area after rupture, per cent. of original section		11. 8
Position of rupture		1″.10 from neck

Character of broken surface—irregular surface, spongy; color varies from light yellow to dark copper color. Surface of stem broken by numerous fine cracks.

Elongation of inch sections .... ″.12, ″.10*, ″.08

No. 3697.

Marks, 2.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000067	.000067	....	....	
750	3,000	.000133	.000166	....	....	
1,000	4,000	.000200	.000067	....	....	
1,250	5,000	.000267	.000067	.000033	.000033	
1,500	6,000	.000533	.000266	....	....	
1,750	7,000	.000700	.000167	....	....	Elastic limit approximate.
2,000	8,000	.001333	.000633	....	....	
2,250	9,000	.002333	.001000	....	....	
2,500	10,000	.006000	.003667	....	....	
2,750	11,000	.010833	.004833	....	....	
3,000	12,000	.020833	.010000	....	....	
3,250	13,000	.028333	.007500	....	....	
3,500	14,000	.0433	.014967	....	....	
3,750	15,000	.0567	.0134	....	....	
4,000	16,000	.0667	.0100	....	....	
4,250	17,000	.0767	.0100	....	....	
4,500	18,000	.0933	.0166	....	....	
4,750	19,000	.1067	.0134	....	....	
5,000	20,000	.1267	.0200	....	....	
5,250	21,000	.1400	.0133	....	....	
5,500	22,000	.1633	.0233	....	....	
5,750	23,000	.1833	.0200	....	....	
5,780	23,120	....	....	....	....	Tensile strength.

General summary.

Specific gravity		8.2116
Hardness		3.33–
Tensile strength per square inch of original section	pounds..	23,120
Elastic limit per square inch of original section	do...	7,000
Elongation per inch after rupture	inch..	0.2100
Elongation per inch under strain at elastic limit	do...	.000700
Reduction in diameter at point of rupture	do...	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		″.55 from the neck
Character of broken surface, irregular spongy surface. Color varies from light yellow to dark purple. Surface of stem broken with numerous fine cracks.		
Elongation of inch sections		″.18, ″.19, ″.26*

No. 3698.

Marks, 3.
Diameter, ″.564.
Sectional area, .25 square inch.
Surface of specimen, porous.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000067	.000067	....	....	
750	3,000	.000200	.000133	....	....	
1,000	4,000	.000267	.000067	....	....	
1,250	5,000	.000333	.000066	....	....	
1,500	6,000	.000433	.000100	....	....	
1,750	7,000	.000533	.000100	....	....	
2,000	8,000	.000667	.0 0134	....	....	
2,250	9,000	.000767	.000100	....	....	Elastic limit.
2,500	10,000	.001000	.000233	.000167	.000167	
2,750	11,000	.001300	.000300	....	....	
3,000	12,000	.001667	.000367	....	....	
3,250	13,000	.002067	.000400	....	....	
3,500	14,000	.002733	.000666	....	....	
3,750	15,000	.003333	.000600	.001600	.001433	
4,000	16,000	.004000	.000667	....	....	
4,250	17,000	.004600	.000600	....	....	
4,500	18,000	.005933	.001333	....	....	
4,750	19,000	.006767	.000834	....	....	
5,000	20,000	.009000	.002233	....	....	
5,250	21,000	.010400	.001400	....	....	
5,500	22,000	.013267	.002867	....	....	
5,750	23,000	.015000	.001733	....	....	
6,000	24,000	.019833	.004833	....	....	
6,250	25,000	.021833	.002000	....	....	
6,500	26,000	.027000	.005167	....	....	
7,000	28,000	.035000	.008000	....	....	
7,500	30,000	.0500	.0150	....	....	
8,000	32,000	.0633	.0133	....	....	
8,500	34,000	.0767	.0134	....	....	
9,000	36,000	.0933	.0166	....	....	
9,500	38,000	.1100	.0167	....	....	
10,000	40,000	.1400	.0300	....	....	Tensile strength.

General summary.

Specific gravity		8.0247
Hardness		4.54
Tensile strength per square inch of original section	pounds..	40,000
Elastic limit per square inch of original section	do...	9,000
Elongation per inch after rupture	inch..	0.1567
Elongation per inch under strain at elastic limit	do...	.000767
Reduction in diameter at point of rupture	do...	.054
Reduction in area after rupture, per centum of original section		18.3
Position of rupture		1″.75 from the neck

Character of broken surface, irregular, spongy surface. Color varies from light yellow to pale lavender. Surface of stem broken with numerous cracks.

Elongation of inch sections .... ″.14, ″.20*, ″.13

No. 3699.

Marks, 4.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
500	2, 000	.000133	.000133	....	....	
750	3, 000	.000233	.000100	....	....	
1, 000	4, 000	.000300	.000067	....	....	
1, 250	5, 000	.000367	.000067	0.	....	
1, 500	6, 000	.000467	.000100	....	....	
1, 750	7, 000	.000533	.000066	....	....	
2, 000	8, 000	.000600	.000067	....	....	
2, 250	9, 000	.000667	.000067	....	....	Elastic limit.
2, 500	10, 000	.000933	.000266	.000167	.000167	
2, 750	11, 000	.001167	.000234	....	....	
3, 000	12, 000	.001400	.000233	....	....	
3, 250	13, 000	.001667	.000267	....	....	
3, 500	14, 000	.002233	.000566	....	....	
3, 750	15, 000	.002600	.000367	.001067	.000900	
4, 000	16, 000	.003000	.000400	....	....	
4, 250	17, 000	.003900	.000900	....	....	
4, 500	18, 000	.004667	.000767	....	....	
4, 750	19, 000	.005833	.001166	....	....	
5, 000	20, 000	.007000	.001167	....	....	
5, 250	21, 000	.008300	.001300	....	....	
5, 500	22, 000	.010567	.002267	....	....	
5, 750	23, 000	.011933	.001366	....	....	
6, 000	24, 000	.015500	.003567	....	....	
6, 250	25, 000	.018000	.002500	....	....	
6, 500	26, 000	.022500	.004500	....	....	
7, 000	28, 000	.030667	.008167	....	....	
7, 500	30, 000	.040333	.009666	....	....	
8, 000	32, 000	.0533	.012967	....	....	
8, 500	34, 000	.0667	.0134	....	....	
9, 000	36, 000	.0800	.0133	....	....	
9, 500	38, 000	.0967	.0167	....	....	
10, 000	40, 000	.1200	.0233	....	....	
10, 500	42, 000	.1467	.0267	....	....	
10, 620	42, 480	....	....	....	....	Tensile strength.

General summary.

Specific gravity		8. 1337
Hardness		4. 71
Tensile strength per square inch of original section	pounds	42, 480
Elastic limit per square inch of original section	do	9, 000
Elongation per inch after rupture	inch	0.1500
Elongation per inch under strain at elastic limit	do	.000667
Reduction in diameter at point of rupture		.054
Reduction in area after rupture, per centum of original section		18. 3
Position of rupture		″.5 from the neck
Character of broken surface, irregular spongy surface. Color varies from light yellow to pale lavender. Surface of stem broken with numerous cracks.		
Elongation of inch sections		″.16, ″.15, ″.14

BRONZE FROM TWO BUSHING RINGS, AND ONE SPECIMEN FROM TRAY CASTING FOR 10″ B. L. RIFLE.

No. 3703.

BUSHING RING.

Mark 1.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
520	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000500	.000500			
2,500	10,000	.001133	.000633	.000167	.000167	
2,750	11,000	.001200	.000067			Elastic limit.
3,000	12,000	.001533	.000333			
3,250	13,000	.001833	.000300			
3,500	14,000	.002467	.000634			
3,750	15,000	.003200	.000733	.001900	.001733	
4,000	16,000	.005000	.001800			
4,250	17,000	.006600	.000600			
4,500	18,000	.010833	.004233			
4,750	19,000	.017333	.006500			
4,920	19,680					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	19,680
Elastic limit per square inch of original section	do	11,000
Elongation per inch after rupture	inch	0.0300
Elongation per inch under strain at elastic limit	do	.001200
Reduction in diameter at point of rupture	do	.014
Reduction in area after rupture, per centum of original section		5.0
Position of rupture		¾″ from the neck

Character of broken surface, light lavender colored, interspersed with yellow metal. Opened cracks along surface of stem.

No. 3704.

Bushing Ring.

Marks, 2.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000333	.000333	....	....	
2, 500	10, 000	.000967	.000634	.000100	.000100	
2, 750	11, 000	.001100	.000133	....	....	Elastic limit.
3, 000	12, 000	.001433	.000333	....	....	
3, 250	13, 000	.001800	.000367	....	....	
3, 500	14, 000	.002467	.000667	....	....	
3, 750	15, 000	.003267	.000800	.002033	.001933	
4, 000	16, 000	.005200	.001933	....	....	
4, 250	17, 000	.007000	.001800	....	....	
4, 500	18, 000	.010833	.003833	....	....	
4, 750	19, 000	.015000	.004167	....	....	
5, 000	20, 000	.022500	.007500	....	....	
5, 250	21, 000	.029667	.007167	....	....	
5, 460	21, 840	.042167	.012500	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..................................pounds..	21, 840
Elastic limit per square inch of original section..do...	11, 000
Elongation per inch after rupture..inch..	0. 0467
Elongation per inch under strain at elastic limit ....do ...	.001100
Reduction in diameter at point of rupture ....do...	.014
Reduction in area after rupture, per centum of original section	5. 0
Position of rupture	″.80 from the neck

Character of broken surface, light lavender color, interspersed with yellow metal. Opened cracks along surface of stem.

No. 3705.

TRAY CASTING FOR 10″ B. L. RIFLE.

Marks, 10 R.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000300	.000300	....	....	
2,500	10,000	.000700	.000400	....	....	
3,750	15,000	.001100	.000400	....	....	
5,000	20,000	.001833	.000733	.000300	.000300	
5,250	21,000	.001933	.000100	....	....	Elastic limit.
5,500	22,000	.002267	.000334	....	....	
5,750	23,000	.002567	.000300	....	....	
6,000	24,000	.002933	.000366	....	....	
6,250	25,000	.003267	.000334	.001300	.001000	
6,500	26,000	.003800	.000533	....	....	
6,750	27,000	.004367	.000567	....	....	
7,000	28,000	.005200	.000833	....	....	
7,250	29,000	.005833	.000633	....	....	
7,500	30,000	.007000	.001167	....	....	
8,000	32,000	.009533	.002533	....	....	
8,500	34,000	.012500	.002967	....	....	
9,000	36,000	.015700	.003200	....	....	
9,500	38,000	.019267	.003567	....	....	
10,000	40,000	.023033	.003766	....	....	
10,500	42,000	.027233	.004200	....	....	
11,000	44,000	.032933	.005700	....	....	
11,500	46,000	.0383	.005367	....	....	
12,000	48,000	.0433	.0050	....	....	
12,500	50,000	.0533	.0100	....	....	
13,000	52,000	.0567	.0034	....	....	
13,500	54,000	.0633	.0066	....	....	
14,000	56,000	.0733	.0100	....	....	
14,500	58,000	.0800	.0067	....	....	
14,980	59,920	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	59,920
Elastic limit per square inch of original section	do...	21,000
Elongation per inch after rupture	inch..	0.1033
Elongation per inch under strain at elastic limit	do...	.001933
Reduction in diameter at point of rupture	do...	.054
Reduction in area after rupture, per centum of original section		18.3
Position of rupture		at middle of stem
Character of broken surface		coarse granular, light yellow color

BRONZE.

TABULATION OF TENSION SPECIMENS.

DEOXIDIZED BRONZE.

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Gauged length.	Elongation in gauged length.	Area at fracture.		Contraction of area.	Fracture.
								Diameter.	Area.		
		Inches.	*Sq. inches.*	*Pounds.*	*Pounds.*	*Inches.*	*Per cent.*	*Inches.*	*Sq. in.*	*Per cent.*	
2104	1	1. 8822	2. 782	16, 431	28, 110	15	1. 5	1. 86	2. 717	2. 3	5''.8 from neck; lavender color with occasional small yellow spots.
2105	2	1. 8822	2. 782	15, 404	30, 810	15	1. 8	1. 85	2. 688	3. 4	6''.9 from neck; lavender color with spongy spot of yellow metal ½'' from circumference.
2106	3	1. 883	2. 785	14, 000	29, 000	15	1. 7	1. 86	2. 717	2. 4	9'' from neck; lavender colored with spongy spot ¼'' diameter of yellowish green metal ½'' from the circumference. Other small spots of yellow metal interspersed with the lavender-colored metal.
2106*a*	3	1. 129	1. 00	....	26, 920	10	0. 4	....	....	....	Light-yellow and lavender color. Spot of greenish metal near the circumference.
					FROM PORTSMOUTH NAVY-YARD.						
2107	P_1	1. 875	2. 761	10, 000	14, 700	15	0. 9	1. 86	2. 717	1. 6	2''.75 from neck; irregular spongy surface, the color varying from lavender to light-yellow and copper color.
2108	P_2	1. 875	2. 761	9, 000	15, 000	15	0. 7	1. 86	2. 717	1. 6	Do
2108*a*	P_2	1. 129	1. 00	....	16, 810	10	0. 9	....	....	....	Varies from light to deep yellow, in places copper colored and dark purple.
					FROM NORFOLK NAVY-YARD.						
2109	N. No. 1	1. 875	2. 761	11, 000	17, 000	15	1. 7	1. 84	2. 659	3. 7	1'' from neck; irregular surface. Color varies, lavender and light yellow predominating. Spots of dark yellow, copper color, and dark purple.
2109*a*	N. No. 1	1. 129	1. 00	....	17, 250	10	0. 9	....	....	....	Varies from light to deep yellow, in part lavender and copper colored.
2110	N. No. 2	1. 875	2. 761	10, 000	20, 070	15	3. 8	1. 82	2. 602	5. 8	1''.5 from neck; fractured surface similar to No. 2109, but with less dark-purple metal.

TABULATION OF TENSION SPECIMENS—Continued.

FROM NEW YORK NAVY-YARD.

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Gauged length.	Elongation in gauged length.	Area at fracture.		Contraction of area.	Fracture.
								Diameter.	Area.		
		Inches.	*Sq. inches.*	*Pounds.*	*Pounds.*	*Inches.*	*Per cent.*	*Inches.*	*Sq. in.*	*Per cent.*	
2111	Y N. Y. N. Y. 1	1.875	2.761	9,000	19,880	15	4.6	1.82	2.602	5.8	At the neck; irregular surface; color varies from light to dark yellow, with parts copper colored and parts shading from dark brown to purple and green.
2112	Y N. Y. N. Y. 2	1.875	2.761	9,000	19,300	15	3.6	1.84	.2659	3.7	Similar to No. 2111, except there was no green colored metal present.
2112*a*	Y N. Y. N. Y. 2	1.129	1.00	....	19,760	10	2.1	....	....	....	Light yellow 10 per cent., intermingled with 90 per cent. copper colored and lavender metal.
ALUMINUM BRONZE POURED FROM SAME HEAT OF METAL USED IN PROPELLER FOR GUN-BOAT No. 2.											
2456	....	1.92	2.895	17,000	39,860	15	6.7	1.82	2.602	10.1	5″.6 from neck. Light yellow spot in metal of yellowish lavender color, porous. Section of purple colored metal around about 2″ of circumference, about ″.20 deep.
ALUMINUM BRONZE FROM THIRD PROPELLER FOR GUN-BOAT No. 2.											
2615	....	1.93	2.93	....	19,000	....	....	....	....	....	1″ from middle of stem; 45 per cent. of fractured surface contains a black powder thought to be foundry facing; 55 per cent., light yellow interspersed with lavender colored metal.
2616	....	1.92	2.90	....	35,590	10	1.9	....	....	....	1″ from neck. Varies from golden brown to lavender color and light yellow. Porous around 1¼″ of circumference.
2617	....	.753	.445	....	22,610	....	....	....	....	....	1¾″ from neck at a spongy spot; 45 per cent., dark colored spongy; 55 per cent., light yellow with lavender cast. There was a cavity near the center of the bar about ″.08 × ″.15 in cross-section.
2618	P B	1.99	3.11	14,000	30,840	15	0.7	....	....	....	At the neck. Golden yellow interspersed with lavender colored metal. Ring of lavender colored metal at circumference.
2619	P A	1.98	3.08	14,000	29,940	15	0.6	....	....	....	At the neck. Golden yellow. dark brownish, and lavender colored metal interspersed.

BRONZE FROM CONSOLE BREECH MECHANISM. SEA-COAST GUNS.

3696	1	.564	.25	8,000	19,920	3	10.0	.53	.2206	11.8	1″.1 from neck. Irregular, surface spongy; color varies from light yellow to dark copper color. Surface of stem broken by numerous fine cracks.
3697	2	.564	.25	7,000	23,120	3	21.0	.50	.1964	21.4	″.55 from neck. Irregular spongy surface; color varies from light yellow to dark purple. Surface of stem broken with numerous fine cracks.
3698	3	.564	.25	9,000	40,000	3	15.7	.51	.2043	18.3	1″.75 from neck. Irregular spongy surface; color varies from light yellow to pale lavender. Surface of stem broken with numerous cracks.
3699	3	.564	.25	9,000	42,480	3	15.0	.51	.2043	18.3	″.5 from neck. Irregular spongy surface; color varies from light yellow to pale lavender. Surface of stem broken with numerous cracks.

BRONZE FROM TWO BUSHING RINGS, AND ONE SPECIMEN FROM TRAY CASTING FOR 10″ B. L. RIFLE.

3703	1	.564	.25	11,000	19,680	3	3.0	.55	.2376	5.0	¾″ from neck. Light lavender color, interspersed with yellow metal. Opened cracks along surface of stem.
3704	2	.564	.25	11,000	21,840	3	4.7	.55	.2376	5.0	″.80 from neck. Light lavender color, interspersed with yellow metal. Opened cracks along surface of stem.
3705	10 R	.564	.25	25,000	59,920	3	10.3	.51	.2043	18.3	At middle of stem. Coarse granular, light yellow color.

BRONZE.

TABULATION OF COMPRESSION SPECIMENS.

DEOXIDIZED BRONZE.

No. of test.	Marks.	Dimensions.		Sectional area.	Elastic limit per square inch.	Ultimate strength per square inch.	Manner of failure.	Fracture.
		Length.	Diameter.					
		Inches.	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*		
761	1	12	1. 506	1. 781	14, 000	34; 140	Triple flexure.....	Bar fractured when middle deflection reached 1″.04. Appearance, uniform; light yellow and lavender color.
765	2	12	1. 506	1. 781	16, 000	33, 210	....do	Bar fractured when middle deflection reached 1″.20. Appearance, uniform; light yellowish lavender color.
766	3	12	1. 506	1. 781	17, 000	34, 210	... do	Bar fractured when middle deflection reached 1″.14. Appearance, light yellowish lavender color.
FROM PORTSMOUTH NAVY-YARD.								
767	P_1	12	1. 503	1. 774	10, 000	19, 610	Triple flexure	Bar fractured when middle deflection reached 2″.35. Appearance varies from light to deep yellow, with lavender cast in places.
768	P_2	12	1. 503	1. 774	10, 000	20, 690	....do	Bar fractured when middle deflection reached 1″.9. Appearance of fracture varies from light to deep yellow, with lavender cast.
FROM NORFOLK NAVY-YARD.								
769	N. No. 1	12	1. 500	1. 767	13, 000	23, 090	Triple flexure	Bar fractured when middle deflection reached 3″.35. Appearance varies from light to deep yellow, with lavender cast.
770	N. No. 2	12	1. 500	1. 767	13, 000	22, 810	....do	Bar fractured when middle deflection reached 2.″65. Appearance varies from light to deep yellow, with lavender cast.
FROM NEW YORK NAVY-YARD.								
771	$\overset{Y}{\underset{1}{\text{N. Y. N. Y.}}}$	12	1. 500	1. 767	10, 000	20, 460	Triple flexure	Bar fractured when middle deflection reached 3″. Appearance varies from light to deep yellow lavender color at circumference.
772	$\overset{Y}{\underset{2}{\text{N. Y. N. Y.}}}$	12	1. 500	1. 767	10, 000	20, 540	....do	Bar fractured when middle deflection reached 2″.35. Appearance varies from light to deep yellow lavender color at circumference.

BRONZE.

TABULATION OF TRANSVERSE SPECIMENS.

[End bearings 18″ apart.]

DEOXIDIZED BRONZE.

No. of test.	Marks.	Dimensions.		Elastic limit.		Ultimate strength.		Manner of failure.	Specific gravity.	Hardness.
		Breadth.	Depth.	Total.	Maximum fiber stress per square inch.	Total.	Maximum fiber stress per square inch.			
		Inches.	*Inches.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*			
42	1	1.50	1.50	1,750	14,000	8,310	66,480	Bent 28°, then fractured. Appearance, light yellow color, radiated at edges from center.	8.4767	7.11
43	2	1.50	1.50	1,875	15,000	5,650	45,200	Bent 22°, then fractured. Appearance, light yellow color with lavender cast.	8.2027	4.79
44	3	1.50	1.50	2,625	21,900	7,200	57,600	Bent 14°, then fractured. Appearance, light yellow color with lavender cast.	8.5317	7.96
FROM PORTSMOUTH NAVY-YARD.										
45	P_1	1.50	1.50	2,250	18,000	4,540	36,320	Bent 21°, then fractured. Appearance, light yellow with spots of lavender cast.	8.4269	5.06
46	P_2	1.50	1.50	1,625	13,000	5,380	43,040	Bent 34°, then fractured. Appearance, light yellow with darker yellow cast in places.	8.1449	3.33±
FROM NORFOLK NAVY-YARD.										
47	N. No. 1	1.50	1.50	2,250	18,000	8,180	....	Bent 59°, then fractured. Appearance, light yellow color with lavender cast in places.	8.6150	5.04
48	N. No. 1	1.50	1.50	2,375	19,000	7,860	....	Bent 60°, then fractured. Appearance, light yellow color shading into darker yellow.	8.5716	4.94
FROM NEW YORK NAVY-YARD.										
49	N. Y. $\frac{Y}{1}$ N. Y.	1.50	1.50	1,375	11,000	8,600	....	Bent 76°, then fractured. Appearance, light yellow color; edges have lavender cast.	8.3389	4.86
50	N. Y. $\frac{Y}{2}$ N. Y.	1.50	1.50	1,750	14,000	6,000	48,000	Bent 39°, then fractured. Appearance, light yellow color; edges have lavender cast.	8.4691	4.36

TABULATION OF TRANSVERSE SPECIMENS—Continued.

ALUMINUM BRONZE POURED FROM SAME HEAT OF METAL USED IN PROPELLER FOR GUN-BOAT No. 2.

No. of test.	Marks.	Dimensions.		Elastic limit.		Ultimate strength.		Manner of failure.	Specific gravity.	Hardness.
		Breadth.	Depth.	Total.	Maximum fiber stress per square inch.	Total.	Maximum fiber stress per square inch.			
		Inches.	*Inches.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*			
51	....	1.50	1.50	2, 625	21, 000	8, 620	....	Bar drew off end bearings under 8,620 pounds total load. End bearings then set 15″ apart. Bar bent 57°, then fractured. Appearance, pale lavender color, containing light yellow spots—porous. Surface cracks developed on tension side.	....	....

ALUMINUM BRONZE CAST FROM SAME METAL AS SECOND PROPELLER FOR GUN-BOAT No. 2.

No. of test.	Marks.	Breadth.	Depth.	Elastic limit, Total.	Elastic limit, Maximum fiber stress per square inch.	Ultimate strength, Total.	Ultimate strength, Maximum fiber stress per square inch.	Manner of failure.	Specific gravity.	Hardness.
52	....	1.50	1.50	....	....	15, 100	....	Bar drew off end bearings under 10,600 pounds total load. End bearings then set 15″ apart. Bent 57½°, then fractured. Appearance, in part yellow with lavender cast, in part light yellow—porous. Surface of stem contains numerous small blow-holes which did not dress out in finishing to size.	....	8.71 9.08

TWO SAMPLES OF BRASS FROM SCREW PROPELLER OF REVENUE STEAMER DALLAS.

Chemical composition .... {
Zn...... 41.50
Al...... .75
Cu...... 57.75

No. 2484.

Diameter of stem, ″.60.
Sectional area, .283 square inch.
Elastic limit, 6,350 pounds = 22,430 pounds per square inch.
Tensile strength, 15,140 pounds = 53,500 pounds per square inch.
Elongation in 3 inches, ″.64 = 21.3 per cent.
Diameter at fracture, ″.49. Area, .189 square inch.
Contraction, 33.2 per cent.
Elongation of inch sections, ″.19, ″.21, ″.24*.

Fractured ″.80 from neck. Appearance, light yellow color, with small spots of deeper yellow metal.

No. 2485.

Diameter of stem, ″.57.
Sectional area, .285 square inch.
Elastic limit, 5,400 pounds = 21,180 pounds per square inch.
Tensile strength, 13,790 pounds = 54,080 pounds per square inch.
Elongation in 3 inches, ″.48 = 16.0 per cent.

Diameter at fracture, ″.50. Area, .196 square inch. Contraction, 23.1 per cent.

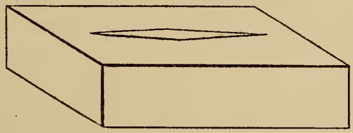
Elongation of inch sections, ″.13, ″.13, ″.22*.

Fractured ″.20 from neck. Appearance, light yellow color, with small spots of deeper yellow metal. Spongy metal at the circumference.

CUTS IN COPPERS MADE WITH CIRCULAR INDENTING TOOL.

Cutter has radius of curvature of 12½″. Angle of sides of cutter, 60°.

Shape of Coppers.



No. of test.	Copper.	Pressure on cutter.	Pressure referred to piston .1 square inch area.	Length of cut.
		Pounds.	*Pounds per square inch.*	*Inches.*
2625	1	4,100	41,000	.961
2626	2	4,200	42,000	.962
2627	3	4,300	43,000	.969
2628	4	4,400	44,000	.989
2629	5	4,500	45,000	.986
2630	6	4,600	46,000	.999
2631	7	4,700	47,000	1.002
2632	8	4,800	48,000	1.007
2633	9	4,900	49,000	1.019
2634	10	5,000	50,000	1.029

TEMPERATURE TESTS

OF

STEEL BARS.

STEEL BARS, FIRST SERIES.

SPECIMENS WHICH WERE EXPOSED TO HIGH TEMPERATURE, SLOWLY COOLED, AND THEN TESTED BY TENSION.

No. 3340.

Marks, 10–334.

Expansion when hot, ″.0597 in 6″.

Estimated maximum temperature, 1684° Fahr.

Remained under maximum temperature 20 minutes, then allowed to cool, and tested at 70° Fahr.

Diameter, ″.564.

Sectional area, .25 square inch.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	Initial load.
1, 250	5, 000	.0010	....	
2, 500	10, 000	.0018	....	
3, 750	15, 000	.0026	....	
5, 000	20, 000	.0035	....	
6, 250	25, 000	.0042	....	
7, 500	30, 000	.0051	....	
8, 750	35, 000	.0059	....	
10, 000	40, 000	.0069	....	
11, 250	45, 000	.0077	....	
12, 500	50, 000	.0086	....	
13, 750	55, 000	.0095	....	
15, 000	60, 000	.0103	....	
16, 250	65, 000	.0112	....	Elastic limit.
16, 500	66, 000	.0172	....	
17, 000	68, 000	.0225	....	
17, 500	70, 000	.0282	....	
18, 000	72, 000	.0321	....	
18, 500	74, 000	.0365	....	
19, 000	76, 000	.0400	....	
19, 500	78, 000	.0445	....	
20, 000	80, 000	.0480	....	
21, 000	84, 000	.055	....	
22, 000	88, 000	.070	....	
23, 000	92, 000	.085	....	
24, 000	96, 000	.085	....	
25, 000	100, 000	.100	....	
26, 000	104, 000	.105	....	
27, 000	108, 000	.120	....	
28, 000	112, 000	.135	....	
29. 000	116, 000	.17	....	
30, 000	120. 000	.185	....	
31, 000	124, 000	.20	....	
32, 000	128, 000	.225	....	
33, 000	132, 000	.29	....	
34, 000	136, 000	.39	....	
34, 120	136, 480	.44	....	Tensile strength.
33, 100	....	....	....	At time of fracture.
0	0	.40	....	=8.0 per cent.

Fractured at middle of stem.

Appearance, granular, radiating from a point in the circumference.

Diameter at fracture, ″.53. Area, .2206 square inch.

Contraction, 11.8 per cent.

Elongation of inch sections, ″.06, ″.08, ″.15*, ″.07, ″.04.

No. 3341.

Marks, 10–334.
Expansion when hot, ″.0540 in 6″.
Estimated maximum temperature, 1529° Fahr.
Remained under maximum temperature 10 minutes, then allowed to cool, and tested at 70° Fahr.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	Initial load
1,250	5,000	.0008		
2,500	10,000	.0017		
3,750	15,000	.0025		
5,000	20,000	.0032		
6,250	25,000	.0041		
7,500	30,000	.0050		
8,750	35,000	.0058		
10,000	40,000	.0068		
11,250	45,000	.0076		
12,500	50,000	.0084		
13,750	55,000	.0092		
15,000	60,000	.0101		
16,250	65,000	.0110		
17,500	70,000	.0119		
18,000	72,000	.0125		
18,300	73,200	.0210		Elastic limit.
18,500	74,000	.0273		
19,000	76,000	.0306		
19,500	78,000	.0342		
20,000	80,000	.0393		
21,000	84,000	.0461		
22,000	88,000	.0550		
23,000	92,000	.0638		
24,000	96,000	.0725		
25,000	100,000	.0840		
26,000	104,000	.10		
27,000	108,000	.10		
28,000	112,000	.11		
29,000	116,000	.12		
30,000	120,000	.16		
31,000	124,000	.16		
32,000	128,000	.185		
33,000	132,000	.195		
34,000	136,000	.23		
35,000	140,000	.29		
35,850	143,400	.40		Tensile strength.
35,650				At time of fracture.
0	0	.38		=7.6 per cent.

Fractured 2″.4 from the neck.
Appearance, granular, radiating from a point in the circumference.
Diameter at fracture, ″.53. Area, .2206 square inch.
Contraction, 11.8 per cent.
Elongation of inch sections, ″.05, ″.08, ″.14*, ″.06, ″.05.

TEMPERATURE TESTS.

SECOND SERIES, STEEL BARS.

HOT-ROLLED BARS, 1¼ INCHES DIAMETER.

CHEMICAL COMPOSITION OF STEEL BARS.

Marks.	Chemical composition.						
	Carbon.	Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.	Iron, by difference.
1	.17	1.13	.023	.122	.079	.04	98.436
2	.20	.69	.037	.13	.078	.26	98.605
3	.21	1.26	.08	.14	.059	.000	98.251
4	.26	1.07	.11	.096	.08	.047	98.337
6	.26	1.26	.07	.112	.06	.038	98.200
7	.26	1.28	.07	.115	.062	.035	98.178
8	.28	1.23	.09	.168	.09	.178	97.964
9	.43	.97	.05	.08	.096	.024	98.350
10	.43	1.08	.037	.08	.114	.233	98.026
11	.53	.75	.10	.078	.087	.174	98.281
12	.55	1.02	.05	.078	.12	.15	98.032
14	.72	.70	.18	.07	.13	.23	97.970
15	.72	.76	.20	.056	.086	.186	97.992
16	.79	.86	.21	.084	.093	.096	97.867
17	1.07	.07	.13	.01	.018	.006	98.696
18	1.08	.12	.19	.011	.02	Trace	98.579
19	1.12	.10	.09	.013	.018	Trace	98.659
20	1.14	.10	.15	Trace	.018	Trace	98.592
21	1.17	.10	.10	Trace	.018	.000	98.612
22	1.31	.13	.19	.011	.026	Trace	98.333

CO-EFFICIENT OF EXPANSION DETERMINATIONS.

Bars 1⅛″ diameter turned down from 1¼″ diameter.

Measurements of lengths taken between drilled and counter-sunk holes about 35″ apart.

Temperatures of cold bath of ice-water and hot bath of oil determined by means of mercurial thermometer.

UNDER RISING TEMPERATURE.

Marks.	Temperature.			Lengths.		Expansion.	
	Cold.	Hot.	Difference.	Cold.	Hot.	Total.	Per unit of length per degree Fahr.
	°*F.*	°*F.*	°*F.*	*Inches.*	*Inches.*	*Inches.*	*Inch.*
1	33.8	212.7	178.9	34.9943	35.0368	.0425	.0000067886
2	33.8	210.9	177.1	34.9988	35.0413	.0425	.0000068567
3	33.8	209.1	175.3	35.0092	35.0507	.0415	.0000067623
4	33.8	209.1	175.3	35.0009	35.0423	.0414	.0000067476
6	33.8	208.8	175.0	34.9998	35.0409	.0411	.0000067102
7	33.8	215.0	181.2	34.9977	35.0403	.0426	.0000067175
8	33.8	209.1	175.3	35.0043	35.0459	.0416	.0000067794
9	33.8	212.7	178.9	34.9974	35.0388	.0414	.0000066124
10	33.8	215.0	181.2	35.0029	35.0450	.0421	.0000066377
11	33.8	211.0	177.2	34.9958	35.0356	.0398	.0000064180
12	33.8	211.4	177.6	34.9988	35.0399	.0411	.0000066122
14	33.8	211.0	177.2	35.0025	35.0424	.0399	.0000064330
15	33.8	212.7	178.9	35.0025	35.0420	.0395	.0000063080
16	33.8	212.7	178.9	35.0007	35.0405	.0398	.0000063562
17	33.8	211.2	177.4	34.9979	35.0361	.0382	.0000061528
18	33.8	213.0	179.2	35.0004	35.0391	.0387	.0000061702
19	33.8	209.1	175.3	34.9987	35.0371	.0384	.0000062589
20	33.8	215.0	181.2	34.9949	35.0334	.0385	.0000060716
21	33.8	212.7	178.9	34.9971	35.0355	.0384	.0000061332
22	33.8	215.0	181.2	35.0094	35.0484	.0390	.0000061478

CO-EFFICIENT OF EXPANSION DETERMINATIONS—Continued.

UNDER FALLING TEMPERATURE.

Marks.	Temperature.			Lengths.		Contraction.	
	Hot.	Cold.	Difference.	Hot.	Cold.	Total.	Per unit of length per degree Fahr.
	°*F.*	°*F.*	°*F.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*
1	212.7	33.8	178.9	35.0368	34.9946	.0422	.0000067407
2	210.9	33.8	177.1	35.0413	34.9985	.0428	.0000069052
3	209.1	33.8	175.3	35.0507	35.0091	.0416	.0000067784
4	209.1	33.8	175.3	35.0423	35.0006	.0417	.0000067964
6	208.8	33.8	175.0	35.0409	34.9992	.0417	.0000068083
7	215.0	33.8	181.2	35.0403	34.9970	.0433	.0000068280
8	209.1	33.8	175.3	35.0459	35.0041	.0418	.0000068120
9	212.7	33.8	178.9	35.0388	34.9975	.0413	.0000065964
10	215.0	33.8	181.2	35.0450	35.0030	.0420	.0000066220
11	211.0	33.8	177.2	35.0356	34.9956	.0400	.0000064504
12	211.4	33.8	177.6	35.0399	34.9986	.0413	.0000066443
14	211.0	33.8	177.2	35.0424	35.0025	.0399	.0000064330
15	212.7	33.8	178.9	35.0420	35.0025	.0395	.0000063080
16	212.7	33.8	178.9	35.0405	35.0007	.0398	.0000063562
17	211.2	33.8	177.4	35.0361	34.9979	.0382	.0000061528
18	213.0	33.8	179.2	35.0391	35.0000	.0391	.0000062340
19	209.1	33.8	175.3	35.0371	34.9986	.0385	.0000062752
20	215.0	33.8	181.2	35.0334	34.9948	.0386	.0000060874
21	212.7	33.8	178.9	35.0355	34.9971	.0384	.0000061332
22	215.0	33.8	181.2	35.0484	35.0094	.0390	.0000061478

MODULI OF ELASTICITY

AT

DIFFERENT TEMPERATURES.

No. 3317.

Mark, 1.
Diameter, 1''.0092.
Sectional area, .80 square inch.
Gauged length, 10''.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0015		
8,000	10,000	.0030		
12,000	15,000	.0048		
16,000	20,000	.0065		
20,000	25,000	.0082		
24,000	30,000	.0100		
28,000	35,000	.0116		
32,000	40,000	.0133		E = 29,323,000.
28,000	35,000	.0116		
24,000	30,000	.0100		
20,000	25,000	.0082		
16,000	20,000	.0067		
12,000	15,000	.0048		
8,000	10,000	.0033		
4,000	5,000	.0001	.0001	

No. 3323.

Marks, 2.
Diameter, 1''.0092.
Sectional area, .80 square inch.
Gauged length, 10''.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0015		
8,000	10,000	.0031		
12,000	15,000	.0049		
16,000	20,000	.0066		
20,000	25,000	.0084		
24,000	30,000	.0100		
28,000	35,000	.0118		
32,000	40,000	.0134		E = 29,104,000.
28,000	35,000	.0118		
24,000	30,000	.0101		
20,000	25,000	.0084		
16,000	20,000	.0067		
12,000	15,000	.0049		
8,000	10,000	.0032		
4,000	5,000	.0015	0.	

No. 3321.

Marks, 3.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	Initial load.
4, 000	5, 000	.0013	....	
8, 000	10, 000	.0031	....	
12, 000	15, 000	.0047	....	
16, 000	20, 000	.0065	....	
20, 000	25, 000	.0081	....	
24, 000	30, 000	.0098	....	
28, 000	35, 000	.0116	....	
32, 000	40, 000	.0132	....	E = 29,545,000.
28, 000	35, 000	.0117	....	
24, 000	30, 000	.0100	....	
20, 000	25, 000	.0083	....	
16, 000	20, 000	.0065	....	
12, 000	15, 000	.0049	....	
8, 000	10, 000	.0032	....	
4, 000	5, 000	.0015	.0001	

No. 3320.

Marks, 4.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	Initial load.
4. 000	5, 000	.0012	....	
8, 000	10, 000	.0030	....	
12, 000	15, 000	.0047	....	
16, 000	20, 000	.0065	....	
20, 000	25, 000	.0082	....	
24, 000	30, 000	.0099	....	
28, 000	35, 000	.0115	....	
32, 000	40, 000	.0132	....	E=29,545,000.
28, 000	35, 000	.0116	....	
24, 000	30, 000	.0100	....	
20, 000	25, 000	.0083	....	
16, 000	20, 000	.0065	....	
12, 000	15, 000	.0047	....	
8, 000	10, 000	.0030	....	
4, 000	5, 000	.0014	0.	

No. 3313.

Marks, 5.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0013		
8,000	10,000	.0030		
12,000	15,000	.0046		
16,000	20,000	.0065	0.	
20,000	25,000	.0082		
24,000	30,000	.0100		E=29,000,000.
20,000	25,000	.0084		
16,000	20,000	.0066		
12,000	15,000	.0049		
8,000	10,000	.0032		
4,000	5,000	.0015	.0001	
Bar heated; expansion, ″.0317 in 10″. Estimated temperature, 542° Fahr.				
800	1,000	0.	0.	Initial load.
16,000	20,000	.0065		E=27,143,000.
800	1,000		—.0010	
Expansion, ″.0614 in 10″. Estimated temperature, 984° Fahr.				
800	1,000	0.	0.	Initial load.
16,000	20,000	.0088		E=21,714,000.
800	1,000		.0001	
Expansion, ″.0541 in 10″. Estimated temperature, 875° Fahr.				
800	1,000	0.	0.	Initial load.
16,000	20,000	.0080		E=23,602,000.
800	1,000	.0079		
16,000	20,000	.0080		
800	1,000	.0083		
16,000	20,000	.0079		
800	1,000	.0081		
16,000	20,000	.0074		
800	1,000	.0088		
Expansion, ″.0688 in 10″. Estimated temperature, 1094° Fahr.				
800	1,000	0.	0.	Initial load.
16,000	20,000	.0105		E=19,916,000.
800	1,000	.0091		
16,000	20,000	.0093		
800	1,000	.0096		
16,000	20,000	.0098		
800	1,000	.0099		
Expansion, ″.0862 in 10″. Estimated temperature, 1353° Fahr.				
800	1,000	0.	0.	Initial load.
8,000	10,000	.0061		E=16,989,000.
800	1,000	.0053		
8,000	10,000	.0052		
800	1,000	.0054		
12,000	15,000	.0103		Bar stretches between readings, hence E not computed.
800	1,000	.0071		
12,000	15,000	.0092		
800	1,000	.0081		
During the preceding hot tests the bar received a permanent set of ″.0071. Temperature, 70° Fahr.				
800	1,000	0.	0.	Initial load.
4,000	5,000	.0016		
8,000	10,000	.0034		
12,000	15,000	.0051		

No. 3313—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
16, 000	20, 000	.0069	....	
20, 000	25, 000	.0087	....	
24, 000	30, 000	.0106	....	E=27,358,000.
20, 000	25, 000	.0087	....	
16, 000	20, 000	.0070	....	
12, 000	15, 000	.0052	....	
8, 000	10, 000	.0035	....	
4, 000	5, 000	.0016	0.	

No. 3318.

Marks, 8.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	Initial load.
4, 000	5, 000	.0014	....	
8, 000	10, 000	.0034	....	
12, 000	15, 000	.0050	....	
16, 000	20, 000	.0072	....	
20, 000	25, 000	.0090	....	
24, 000	30, 000	.0106	....	
28, 000	35, 000	.0122	....	
32, 000	40, 000	.0139	....	E=28, 058, 000.
28, 800	35, 000	.0123	....	
24, 000	30, 000	.0107	....	
20, 000	25, 000	.0091	....	
16, 000	20, 000	.0072	....	
12, 000	15, 000	.0055	....	
8, 000	10, 000	.0037	....	
4, 000	5, 000	.0020	.0006	

No. 3324.

Marks, 9.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0015	....	
8,000	10,000	.0032	....	
12,000	15,000	.0050	....	
16,000	20,000	.0067	....	
20,000	25,000	.0083	....	
24,000	30,000	.0101	....	
28,000	35.000	.0118	....	
32,000	40,000	.0135	....	E=28,889,000.
28,000	35,000	.0117	....	
24,000	30,000	.0102	....	
20,000	25,000	.0084	....	
16,000	20,000	.0067	....	
12,000	15,000	.0050	....	
8,000	10,000	.0033	....	
4,000	5,000	.0016	.0001	

No. 3322.

Marks, 10.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0012	....	
8,000	10,000	.0031	....	
12,000	15,000	.0048	....	
16,000	20,000	.0065	....	
20,000	25,000	.0082	....	
24,000	30,000	.0100	....	
28,000	35,000	.0116	....	
32,000	40,000	.0132	....	E=29,545,000.
28,000	35,000	.0116	....	
24,000	30,000	.0100	....	
20,000	25,000	.0083	....	
16,000	20,000	.0066	....	
12,000	15,000	.0049	....	
8,000	10,000	.0031	....	
4,000	5,000	.0014	.0000	

No. 3315.

Marks, 11.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0012	....	
8,000	10,000	.0030	....	
12,000	15,000	.0048	....	
16,000	20,000	.0065	....	
20,000	25,000	.0083	....	
24,000	30,000	.0100	....	
28,000	35,000	.0120	....	
32,000	40,000	.0137	....	E=28,467,000.
28,000	35,000	.0120	....	
24,000	30,000	.0100	....	
20,000	25,000	.0081	....	
16,000	20,000	.0065	....	
12,000	15,000	.0048	....	
8,000	10,000	.0030	....	
4,000	5,000	.0012	0.	

No. 3316.

Marks, 12.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0013	....	
8,000	10,000	.0029	....	
12,000	15,000	.0048	....	
16,000	20,000	.0065	....	
20,000	25,000	.0083	....	
24,000	30,000	.0101	....	
28,000	35,000	.0116	....	
32,000	40,000	.0136	....	E=28,676,000.
28,000	35,000	.0116	....	
24,000	30,000	.0101	....	
20,000	25,000	.0083	....	
16,000	20,000	.0066	....	
12,000	15,000	.0049	....	
8,000	10,000	.0031	....	
4,000	5,000	.0015	.0001	

No. 3314.

Marks, 13.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	Initial load.
4, 000	5, 000	.0013	....	
8, 000	10, 000	.0030	....	
12, 000	15, 000	.0048	....	
16, 000	20, 000	.0065	....	
20, 000	25, 000	.0082	....	
24, 000	30, 000	.0100	....	
28, 000	35, 000	.0117	....	
32, 000	40, 000	.0132	....	E = 29,545,000.
28, 000	35, 000	.0117	....	
24, 000	30, 000	.0100	....	
20, 000	25, 000	.0082	....	
16, 000	20, 000	.0065	....	
12 000	15, 000	.0048	....	
8, 000	10, 000	.0030	....	
4, 000	5, 000	.0013	....	

No. 3325.

Marks, 14.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	Initial load.
4, 000	5, 000	.0015	....	
8, 000	10, 000	.0032	....	
12, 000	15, 000	.0049	....	
16, 000	20, 000	.0066	....	
20, 000	25, 000	.0084	....	
24, 000	30, 000	.0101	....	
28, 000	35, 000	.0118	....	
32, 000	40, 000	.0135	....	E = 28,889,000.
28, 000	35, 000	.0118	....	
24, 000	30, 000	.0101	....	
20, 000	25, 000	.0085	....	
16, 000	20, 000	.0067	....	
12, 000	15, 000	.0050	....	
8, 000	10, 000	.0032	....	
4, 000	5, 000	.0015	....	

No. 3319.

Marks, 15.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	Initial load.
4, 000	5, 000	.0015	....	
8, 000	10, 000	.0031	....	
12, 000	15, 000	.0048	....	
16, 000	20, 000	.0065	....	
20, 000	25, 000	.0082	....	
24, 000	30, 000	.0100	....	
28, 000	35, 000	.0118	....	
32, 000	40, 000	.0135	....	E=28,889,000.
28, 000	35, 000	.0118	....	
24, 000	30, 000	.0100	....	
20, 000	25, 000	.0084	....	
16, 000	20, 000	.0066	....	
12, 000	15, 000	.0049	....	
8, 000	10, 000	.0031	....	
4, 000	5, 000	.0015	....	

No. 3326.

Marks, 16.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	Initial load.
4, 000	5, 000	.0013	....	
8, 000	10, 000	.0031	....	
12, 000	15, 000	.0047	....	
16, 000	20, 000	.0065	....	
20, 000	25, 000	.0083	....	
24, 000	30, 000	.0100	....	
28, 000	35, 000	.0117	....	
32, 000	40, 000	.0133	....	E=29,323,000.
28, 000	35, 000	.0117	....	
24, 000	30, 000	.0100	....	
20, 000	25, 000	.0083	....	
16, 000	20, 000	.0067	....	
12, 000	15, 000	.0050	....	
8, 000	10, 000	.0032	....	
4, 000	5, 000	.0013	0.	

No. 3329.

Marks, 17.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0012	....	
8,000	10,000	.0030	....	
12,000	15,000	.0047	....	
16,000	20,000	.0065	....	
20,000	25,000	.0081	....	
24,000	30,000	.0099	....	
28,000	35,000	.0115	....	
32,000	40,000	.0131	....	E=29,771,000.
28,000	35,000	.0115	....	
24,000	30,000	.0100	....	
20,000	25,000	.0082	....	
16,000	20,000	.0065	....	
12,000	15,000	.0048	....	
8,000	10,000	.0031	....	
4,000	5,000	.0015	0.	
Bar heated. Expansion, ″.0575 in 10″. Estimated temperature, 1005° Fahr.				
800	1,000	0.	0.	Initial load.
16,000	20,000	.0100	....	Specimen yielding under 20,000 pounds per square inch.
800	1,000	.0091	....	
16,000	20,000	.0094	....	
800	1,000	.0084	....	
12,000	15,000	.0062	....	E=22,838,000.
800	1,000	.0064	....	
12,000	15,000	.0063	....	
800	1,000	.0061	....	
12,000	15,000	.0057	....	
800	1,000	.0061	....	
Expansion, ″.0818 in 10″. Estimated temperature, 1400° Fahr.				
800	1,000	0.	0.	Initial load.
8,000	10,000	.0094	....	E=14,173,000.
800	1,000	.0064	....	
8,000	10,000	.0071	....	
800	1,000	.0051	....	
8,000	10,000	.0064	....	
800	1,000	.0066	....	

The yielding of the specimen under 10,000 pounds per square inch tension while heated at the temperature of the preceding observations, impairs the accuracy of the estimation of the modulus of elasticity.

Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0015	....	
8,000	10,000	.0034	....	
12,000	15,000	.0052	....	
16,000	20,000	.0069	....	
20,000	25,000	.0085	....	
24,000	30,000	.0102	....	
28,000	35,000	.0121	....	
32,000	40,000	.0135	....	E=28,889,000.
28,000	35,000	.0120	....	
24,000	30,000	.0102	....	
20,000	25,000	.0085	....	
16,000	20,000	.0067	....	
12,000	15,000	.0050	....	
8,000	10,000	.0030	....	
4,000	5,000	.0012	—.0004	
32,000	40,000	.0135	—.0004	

No. 3330.

Marks, 19.
Diameter, 1.″0029.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0014	....	
8,000	10,000	.0030	....	
12,000	15,000	.0047	....	
16,000	20,000	.0065	....	
20,000	25,000	.0081	....	
24,000	30,000	.0098	....	
28,000	35,000	.0115	....	
32,000	40,000	.0132	....	E=29,545,000.
28,000	35,000	.0115	....	
24,000	30,000	.0100	....	
20,000	25,000	.0081	....	
16,000	24,000	.0065	....	
12,000	20,000	.0048	....	
8,000	15,000	.0031	....	
4,000	5,000	.0015	0.	

No. 3328.

Marks, 20.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0014	....	
8,000	10,000	.0031	....	
12,000	15,000	.0048	....	
16,000	20,000	.0065	....	
20,000	25,000	.0081	....	
24,000	30,000	.0099	....	
28,000	35,000	.0116	....	
32,000	40,000	.0132	....	E = 29,545,000.
28,000	35,000	.0117	....	
24,000	30,000	.0099	....	
20,000	25,000	.0083	....	
16,000	20,000	.0067	....	
12,000	15,000	.0050	....	
8,000	10,000	.0033	....	
4,000	5,000	.0016	.0002	

No. 3327.

Marks, 21.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0013	....	
8,000	10,000	.0031	....	
12,000	15,000	.0049	....	
16,000	20,000	.0066	....	
20,000	25,000	.0083	....	
24,000	30,000	.0101	....	
28,000	35,000	.0117	....	
32,000	40,000	.0134	....	E = 29,104,000.
28,000	35,000	.0118	....	
24,000	30,000	.0101	....	
20,000	25,000	.0084	....	
16,000	20,000	.0066	....	
12,000	15,000	.0050	....	
8,000	10,000	.0032	....	
4,000	5,000	.0015	.0001	

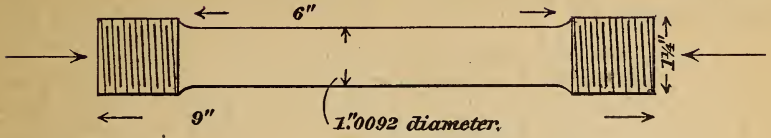
TEMPERATURE TESTS.

INITIAL COMPRESSION FOLLOWED BY TENSION STRESSES, AND COMPRESSED BARS WHICH ARE RESERVED FOR FURTHER TREATMENT.

No. 3342.

Marks, 4.

Form of specimen.



Ends faced off flat.
Sectional area of stem, .80 square inch.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0006	....	
8,000	10,000	.0014	0.	
12,000	15,000	.0023	....	
16,000	20,000	.0031	0.	
20,000	25,000	.0039	....	
24,000	30,000	.0047	.0001	
28,000	35,000	.0056	....	
32,000	40,000	.0063	.0001	
36,000	45,000	.0071	....	
40,000	50,000	.0080	.0001	
44,000	55,000	.0089	....	
48,000	60,000	.0098	.0002	
48,800	61,000	.0099	....	
49,600	62,000	....	....	Elastic limit. Sustained momentarily then load fell and bar deflected.
	62,000	.1073	....	After 2 minutes.
54,100	67,625	....	....	Ultimate strength.

Failed by triple flexure.

No. 3343.

Marks, 4.
Same form as specimen No. 3342.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	Initial load.
8, 000	10, 000	.0015	....	
16, 000	20, 000	.0031	0.	
24, 000	30, 000	.0048	....	
32, 000	40, 000	.0065	.0003	
36, 000	45, 000	.0073	....	
40, 000	50, 000	.0082	.0003	
44, 000	55, 000	.0091	....	
44, 800	56, 000	.0092	....	
45, 600	57, 000	.0093	....	
46, 400	58, 000	.0096	....	
47, 200	59, 000	.0098	....	Elastic limit.
48, 000	60, 000	.0890	.0784	
8, 000	10, 000	.0799	....	
16, 000	20, 000	.0815	....	
24, 000	30, 000	.0831	....	
32, 000	40, 000	.0850	....	
40, 000	50, 000	.0870	....	
32, 000	40, 000	.0854	....	
24, 000	30, 000	.0839	....	
16, 000	20, 000	.0820	....	
8, 000	10, 000	.0802	.0785	

Compression test discontinued.

Stem deflected, v. sine ″.01½ on chord of 6″.

Specimen turned down, for the purpose of straightening the stem, to ″.961 diameter and then tested by tension, after resting without load 12 days 16 hours.

No. 3343*a*.

TENSION TEST.

Diameter, ″.961.
Sectional area, .725 square inch.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
725	1,000	0.	0.	Initial load.
3,625	5,000	.0007	0.	
7,250	10,000	.0015	0.	
10,875	15,000	.0023	0.	
14,500	20,000	.0032	.0000	
18,125	25,000	.0041	.0001	
21,750	30,000	.0051	.0001	
25,375	35,000	.0062	.0005	Elastic limit.
26,100	36,000	.0088	....	
26,825	37,000	.0127	....	
27,550	38,000	.0139	....	
29,000	40,000	.0168	.0099	
3,625	5,000	.0106	....	
7,250	10,000	.0114	....	
10,875	15,000	.0122	....	
14,500	20,000	.0131	....	
18,125	25,000	.0140	....	
21,750	30,000	.0149	....	
25,375	35,000	.0158	....	
21,750	30,000	.0150	....	
18,125	25,000	.0141	....	
14,500	20,000	.0133	....	
10,875	15,000	.0124	....	
7,250	10,000	.0115	....	
3,625	5,000	.0106	.0100	
32,625	45,000	.0273	....	
36,250	50,000	.0460	....	
32,625	45,000	.0452	....	
29,000	40,000	.0444	....	
21,750	30,000	.0426	....	
14,500	20,000	.0408	....	
7,250	10,000	.0387	.0368	
7,250	10,000	.0383	....	
14,500	20,000	.0401	....	
21,750	30,000	.0420	....	
29,000	40,000	.0440	....	
32,625	45,000	.0450	....	
29,000	40,000	.0442	....	
21,750	30,000	.0425	....	
14,500	20,000	.0407	....	
7,250	10,000	.0387	.0370	

Bar set aside for further rest.

No. 3344.

Marks, 4.
Same form as No. 3342.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	Initial load.
8, 000	10, 000	.0015	....	
16, 000	20, 000	.0032	....	
24, 000	30, 000	.0048	....	
32, 000	40, 000	.0065	....	
40, 000	50, 000	.0082	....	
32, 000	40, 000	.0065	....	
24, 000	30, 000	.0049	....	
16, 000	20, 000	.0033	....	
8, 000	10, 000	.0016	.0002	
8, 000	10, 000	.0016	....	
16, 000	20, 000	.0033	....	
24, 000	30, 000	.0050	....	
32, 000	40, 000	.0066	....	
40, 000	50, 000	.0083	....	
44, 000	55, 000	.0091	....	
44, 800	56, 000	.0093	....	
45, 600	57, 000	.0095	....	
46, 400	58, 000	.0096	....	
47, 200	59, 000	.0098	....	Elastic limit.
48, 000	60, 000	.1052	....	
44, 000	55, 000	.1045	....	
40, 000	50, 000	.1067	....	
32, 000	40, 000	.1018	....	
24, 000	30, 000	.0999	....	
16, 000	20, 000	.0979	....	
8, 000	10, 000	.0957	.0935	
8, 000	10, 000	.0950	....	
16, 000	20, 000	.0967	....	
24, 000	30, 000	.0986	....	
32, 000	40, 000	.1005	....	
40, 000	50, 000	.1027	....	
32, 000	40, 000	.1010	....	
24, 000	30, 000	.0992	....	
16, 000	20, 000	.0975	....	
8, 000	10, 000	.0955	.0937	

Compression test discontinued.

Permanent deflection, ″.04 v. sine on chord of 6″.

Specimen turned down to ″.973 diameter for the purpose of straightening the stem, and then tested by tension; interval of rest between compression and tension tests, 12 days 18 hours.

No. 3344*a*.

Tension test.
Diameter, ″.973.
Sectional area, ,7436 square inch.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
744	1,000	0.	0.	Initial load.
3,718	5,000	.0007	0.	
7,436	10,000	.0015	0.	
11,154	15,000	.0023	0.	
14,872	20,000	.0032	0.	
18,590	25,000	.0041	0.	
22,308	30,000	.0049	.0001	
23,052	31,000	.0053	....	
23,796	32,000	.0054	....	
24,540	33,000	.0056	....	
25,283	34,000	.0059	....	
26,026	35,000	.0063	.0006	Elastic limit.
26,770	36,000	.0075	....	
27,514	37,000	.0115	....	
28,258	38,000	.0135	....	
29,001	39,000	.0147	....	
29,744	40,000	.0162	....	
22,308	30,000	.0147	....	
14,872	20,000	.0128	....	
7,436	10,000	.0110	.0093	
7,436	10,000	.0109	....	
14,872	20,000	.0126	....	
22,308	30,000	.0145	....	
29,744	40,000	.0167	....	
33,462	45,000	.0283	....	
29,744	40,000	.0274	....	
22,308	30,000	.0257	....	
14,872	20,000	.0239	....	
7,436	10,000	.0219	.0201	
7,436	10,000	.0217	....	
14,872	20,000	.0235	....	
22,308	30,000	.0253	....	
29,744	40,000	.0272	....	
33,462	45,000	.0287	....	
37,180	50,000	.0452	....	
29,744	40,000	.0437	....	
22,308	30,000	.0419	....	
14,872	20,000	.0400	....	
7,436	10,000	.0379	.0361	
7,436	10,000	.0376	....	
14,872	20,000	.0395	....	
22,308	30,000	.0413	....	
29,744	40,000	.0433	....	
37,180	50,000	.0462	....	
40,898	55,000	.0685	....	
37,180	50,000	.0678	....	
29,744	40,000	.0660	....	
22,308	30,000	.0640	....	
14,872	20,000	.0620	....	
7,436	10,000	.0600	.0580	
7,436	10,000	.0595	....	
14,872	20,000	.0615	....	
22,308	30,000	.0632	....	
29,744	40,000	.0652	....	
37,180	50,000	.0675	....	
40,898	55,000	.0694	....	
44,616	60,000	.0955	....	
37,180	50,000	.0937	....	
29,744	40,000	.0919	....	
22,308	30,000	.0900	....	
14,872	20,000	.0878	....	
7,436	10,000	.0856	.0838	
7,436	10,000	.0852	....	
14,872	20,000	.0871	....	
22,308	30,000	.0890	....	
29,744	40,000	.0910	....	
37,180	50,000	.0932	....	

No. 3344*a*—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
44,616	60,000	.0970	....	
48,334	65,000	.1308	....	
44,616	60,000	.1300	....	
37,180	50,000	.1282	....	
29,744	40,000	.1261	....	
22,308	30,000	.1240	....	
14,872	20,000	.1220	....	
7,436	10,000	.1196	.1175	
7,436	10,000	.1191	....	
14,872	20,000	.1210	....	
22,308	30,000	.1230	....	
29,744	40,000	.1250	....	
37,180	50,000	.1271	....	
44,616	60,000	.1295	....	Sustained this load 2 hours.
52,052	70,000	.1715	....	
44,616	60,000	.1700	....	
37,180	50,000	.1680	....	
29,744	40,000	.1660	....	
22,308	30,000	.1638	....	
14,872	20,000	.1614	....	Rested 1 hour.
7,436	10,000	.1594	.1570	
7,436	10,000	.1585	....	
14,872	20,000	.1604	....	
22,308	30,000	.1624	....	
29,744	40,000	.1645	....	
37,180	50,000	.1666	....	
44,616	60,000	.1690	....	
37,180	50,000	.1671	....	
29,744	40,000	.1651	....	
22,308	30,000	.1631	....	
14,872	20,000	.1610	....	
7,436	10,000	.1589	.1570	

Test discontinued.

No. 3347.

INITIAL OVER-COMPRESSION.

Marks, 4.
Specimen same form as No. 3342.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.
Ends faced off flat.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
8,000	10,000	.0015	....	
16,000	20,000	.0032	....	
24,000	30,000	.0049	....	
32,000	40,000	.0065	....	
40,000	50,000	.0082	.0001	
44,000	55,000	.0090	....	
44,800	56,000	.0092	....	
45,600	57,000	.0094	....	
46,400	58,000	.0095	....	
47,200	59,000	.0098	....	
48,000	60,000	.0100	....	Elastic limit. Sustained load momentarily, then yielded rapidly and under reduced load.
48,000	60,000	.0763	....	

Compression test discontinued.
Permanent deflection, ″.03 on 5″ chord.

No. 3348.

INITIAL OVER-COMPRESSION.

Marks, 4.
Same form as No. 3342.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.
Ends faced off flat.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
8,000	10,000	.0014	....	
16,000	20,000	.0030	....	
24,000	30,000	.0048	....	
32,000	40,000	.0064	....	
40,000	50,000	.0080	....	
44,000	55,000	.0089	....	
44,800	56,000	.0091	....	
45,600	57,000	.0093	....	
46,400	58,000	.0094	....	
47,200	59,000	.0096	....	Elastic limit.
	59,000	.0098	....	After 2 minutes.
	59,000	....	....	After 3 minutes rapid yielding took place.
	59,000	.0954	.0848	After 5 minutes.

Compression test discontinued.
Permanent deflection, ″.03 or 5″ chord.

No. 3349.

INITIAL OVER-COMPRESSION.

Marks, 4.
Same form as No. 3342.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.
Ends faced off flat.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
8,000	10,000	.0015	....	
16,000	20,000	.0031	....	
24,000	30,000	.0048	....	
32,000	40,000	.0064	....	
40,000	50,000	.0081	.0001	
44,000	55,000	.0090	....	
44,800	56,000	.0091	....	
45,600	57,000	.0093	....	
46,400	58,000	.0095	....	
47,200	59,000	.0097	....	Elastic limit sustained load 2 minutes, then rapidly yielded under reduced load.
			....	
			....	
			....	
	59,000	.0927	.0814	After 4 minutes.

Compression test discontinued.
Permanent deflection, ″.04 in 5″.

No. 3352.

INITIAL OVER-COMPRESSION.

Marks, 4.
Same form as No. 3342.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.
Ends faced off flat.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
8,000	10,000	.0015	....	
16,000	20,000	.0031	....	
24,000	30,000	.0048	....	
32,000	40,000	.0064	....	
40,000	50,000	.0081	0.	
44,000	55,000	.0090	....	
44,800	56,000	.0092	....	
45,600	57,000	.0094	....	
46,000	58,000	.0096	....	
47,200	59,000	.0097	....	
	59,000	.0098	....	After 1 minute.
	59,000	.0100	....	After 1½ minutes.
	59,000	.0110	....	After 2½ minutes. After 3 minutes specimen yielded rapidly, load falling.
	59,000	.0975	.0860	After 8 minutes.

Compression test discontinued.
Permanent deflection, ″.04 in 5″.

No. 3353.

INITIAL OVERCOMPRESSION.

Mark, 4.
Same form as No. 3342.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.
Ends faced off flat.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
8,000	10,000	.0015	....	
16,000	20,000	.0032	....	
24,000	30,000	.0049	....	
32,000	40,000	.0065	....	
40,000	50,000	.0081	.0002	
44,000	55,000	.0090	....	
44,800	56,000	.0092	....	
45,600	57,000	.0095	....	
46,400	58,000	.0096	....	
47,200	59,000	.0098	....	
48,000	60,000	.0100	....	Elastic limit.
48,800	61,000	....	....	Load reached, but immediately fell, rapid yielding taking place.
44,800	56,000	.0806	....	Showing additional compression under reduced loads.
45,600	57,000	.0817	....	
46,400	58,000	.0832	....	
40,000	50,000	.0823	....	
32,000	40,000	.0807	....	
24,000	30,000	.0789	....	
16,000	20,000	.0770	....	
8,000	10,000	.0751	.0730	
8,000	10,000	.0744	....	
16,000	20,000	.0761	....	
24,000	30,000	.0778	....	
32,000	40,000	.0797	....	
40,000	50,000	.0816	....	
32,000	40,000	.0800	....	
24,000	30,000	.0785	....	
16,000	20,000	.0767	....	
8,000	10,000	.0749	.0730	

No. 3354.

INITIAL COMPRESSION.

Marks, 4.
Same form as No. 3342.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 5″.
Ends faced off flat.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
8,000	10,000	.0015	....	
16,000	20,000	.0031	....	
24,000	30,000	.0048	....	
32,000	40,000	.0064	....	
40,000	50,000	.0081	0.	
44,000	55,000	.0090	....	
44,800	56,000	.0091	....	
45,600	57,000	.0093	....	
46,400	58,000	.0095	....	
47,200	59,000	.0097	....	
	59,000	.0099	....	After 1 minute.
800	1,000	....	.0005	
8,000	10,000	.0020	....	
16,000	20,000	.0037	....	
24,000	30,000	.0053	....	
32,000	40,000	.0070	....	
40,000	50,000	.0087	....	
32,000	40,000	.0069	....	
24,000	30,000	.0052	....	
16,000	20,000	.0035	....	
8,000	10,000	.0020	.0005	
8,000	10,000	.0019	....	
16,000	20,000	.0035	....	
24,000	30,000	.0052	....	
32,000	40,000	.0068	....	
40,000	50,000	.0085	....	
32,000	40,000	.0069	....	
24,000	30,000	.0052	....	
16,000	20,000	.0036	....	
8,000	10,000	.0020	.0004	

Compression test discontinued.

Under the maximum compression stress applied the specimen was evidently on the point of yielding rapidly; the load was released for the purpose of determining the appreciable effect, if any, of this close approach to a considerable permanent set.

From the behavior of other specimens taken from the same $1\frac{1}{4}''$ hot-rolled bar which this specimen came from, it is evident that considerable yielding would have occurred under the maximum load here applied, had the stress been prolonged; however, at the expiration of $1\frac{1}{2}$ minutes the maximum stress, 59,000 pounds per square inch, was released.

The specimen after 2 hours' rest was then strained by tensile stresses, as follows:

No. 3354*a*.

Gauged length, 4″.9995.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
4,000	5,000	.0006	....	
8,000	10,000	.0015	....	
12,000	15,000	.0025	....	
16,000	20,000	.0034	.0002	
20,000	25,000	.0043	....	
24,000	30,000	.0052	.0002	
28,000	35,000	.0061	....	
32,000	40,000	.0070	.0004	
36,000	45,000	.0080	....	
40,000	50,000	.0090	.0007	
8,000	10,000	.0021	....	
16,000	20,000	.0039	....	
24,000	30,000	.0056	....	
32,000	40,000	.0074	....	
40,000	50,000	.0091	....	
32,000	40,000	.0075	....	
24,000	30,000	.0057	....	
16,000	20,000	.0040	....	
8,000	10,000	.0022	.0007	
40,000	50,000	.0092	....	
40,800	51,000	.0094	....	
41,600	52,000	.0096	....	
42,400	53,000	.0098	....	
43,200	54,000	.0100	....	
44,000	55,000	.0102	.0008	
44,800	56,000	.0104	....	
45,600	57,000	.0108	....	
	57,000	.0121	....	After 1 minute.
40,000	50,000	.0115	....	
32,000	40,000	.0096	....	
24,000	30,000	.0079	....	
16,000	20,000	.0061	....	
8,000	10,000	.0043	.0028	
8,000	10,000	.0043	....	
16,000	20,000	.0060	....	
24,000	30,000	.0080	....	
32,000	40,000	.0096	....	
40,000	50,000	.0115	....	
44,000	55,000	.0124	....	
45,600	57,000	.0145	....	
	57,000	.0975	....	After 2 minutes.
40,000	50,000	.0965	....	
32,000	40,000	.0946	....	
24,000	30,000	.0926	....	
16,000	20,000	.0906	....	
8,000	10,000	.0882	.0860	
8,000	10,000	.0875	....	
16,000	20,000	.0895	....	
24,000	30,000	.0915	....	
32,000	40,000	.0935	....	
40,000	50,000	.0956	....	
32,000	40,000	.0940	....	
24,000	30,000	.0920	....	
16,000	20,000	.0901	....	
8,000	10,000	.0880	.0860	

Specimen rested under 1,000 pounds per square inch tension 44 hours.

No. 3354*a*—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Micrometer reset to zero.
8,000	10,000	.0016	....	
16,000	20,000	.0034	....	
24,000	30,000	.0052	....	
32,000	40,000	.0070	....	
40,000	50,000	.0088	....	
32,000	40,000	.0071	....	
24,000	30,000	.0053	....	
16,000	20,000	.0035	....	
8,000	10,000	.0016	0+	
8,000	10,000	.0017	....	
16,000	20,000	.0036	....	
24,000	30,000	.0054	....	
32,000	40,000	.0071	....	
40,000	50,000	.0088	....	
32,000	40,000	.0071	....	
24,000	30,000	.0053	....	
16,000	20,000	.0036	....	
8,000	10,000	.0017	.0001	
44,000	55,000	.0097	....	Rested under this load 1½ hours.
44,800	56,000	.0101	....	
45,600	57,000	.0103	....	
46,400	58,000	.0105	....	
47,200	59,000	.0107	....	
48,000	60,000	.0109	.0003	
48,800	61,000	.0111	....	
49,600	62,000	.0117	....	
	62,000	.0121	....	After 1 minute.
	62,000	.0123	....	After 2 minutes.
50,400	63,000	.0128	....	
51,200	64,000	.0136	....	
	64,000	.0144	....	After 1 minute.
48,000	60,000	.0137	....	
40,000	50,000	.0119	....	
32,000	40,000	.0101	....	
24,000	30,000	.0083	....	
16,000	20,000	.0064	....	
8,000	10,000	.0045	.0027	
8,000	10,000	.0043	....	
16,000	20,000	.0060	....	
24,000	30,000	.0080	....	
32,000	40,000	.0098	....	
40,000	50,000	.0116	....	
48,000	60,000	.0136	....	
40,000	50,000	.0119	....	
32,000	40,000	.0101	....	
24,000	30,000	.0082	....	
16,000	20,000	.0063	....	
8,000	10,000	.0045	.0028	

Test discontinued.
Test resumed after 10 days' rest without load. Loads applied on basis of original sectional area.
Micrometer reset at zero.

800	1,000	0.	0.	Initial load.
8,000	10,000	.0015	....	
16,000	20,000	.0033	....	
24,000	30,000	.0051	....	
32,000	40,000	.0068	....	
40,000	50,000	.0085	....	
48,000	60,000	.0103	....	
40,000	50,000	.0085	....	
32,000	40,000	.0068	....	
24,000	30,000	.0050	....	
16,000	20,000	.0033	....	
8,000	10,000	.0015	0.	
51,200	64,000	.0112	....	
52,000	65,000	.0114	....	
52,800	66,000	.0116	....	
53,600	67,000	.0118	.0001	

Tension test discontinued, and compression test made 1 hour later.

COMPRESSION TEST.

No. 3354*b*.

Gauged length (on original 5-inch section), 5.085±.
Pounds per square inch applied on basis of original sectional area.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	
4,000	5,000	.0005	0.	Initial load.
8,000	10,000	.0013	0.	
12,000	15,000	.0022	0.	
16,000	20,000	.0032	0.	
20,000	25,000	.0042	....	
24,000	30,000	.0057	.0011	
28,000	35,000	.0114	....	
24,000	30,000	.0107	....	
16,000	20,000	.0090	....	
8,000	10,000	.0073	.0057	
8,000	10,000	.0072	....	
16,000	20,000	.0089	....	
24,000	30,000	.0106	.0057	

Compression test discontinued.

Light chips, taken over stem and threaded sections to straighten the specimen, and then loaded by tension. Interval between compression and tension loadings, 2½ hours.

TENSION TEST.

No. 3354*c*.

Diameter, ″.993.
Sectional area, .774 square inch.
Gauged length (new), 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
774	1,000	0.	0.	
3,874	5,000	.0007	0.	Initial load.
7,740	10,000	.0015	0.	
11,610	15,000	.0025	.0002	
15,480	20,000	.0035	.0002	
19,350	25,000	.0046	.0005	
23,220	30,000	.0058	.0007	
27,090	35,000	.0070	.0010	
30,960	40,000	.0085	.0015	
34,830	45,000	.0100	.0021	
38,700	50,000	.0118	.0030	
42,570	55,000	.0138	.0039	
46,440	60,000	.0162	.0052	
50,310	65,000	.0199	.0075	

Test discontinued.

TEMPERATURE TESTS.

BARS STRAINED BY TENSION WHILE HOT, AND SUBSEQUENTLY TESTED BY COMPRESSION WHEN COLD.

No. 3338.

Marks, 9.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 80°.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	Initial load.
8,000	10,000	.0028	....	
16,000	20,000	.0064	....	
24,000	30,000	.0097	....	
32,000	40,000	.0130	—.0001	E = 29,771,000 pounds per square inch.
Bar now heated to an estimated temperature of 942°. Expansion, ″.0570 in 10″.				
800	1,000	0.	0.	Initial load.
12,000	15,000	.0053	....	
800	1,000	.0059	....	
12,000	15,000	.0056	....	
800	1,000	.0052	....	E = 24,911,000 pounds per square inch.
12,000	15,000	.0056	....	
800	1,000	.0059	....	
12,000	15,000	.0059	....	
800	1,000	.0056	....	
800	1,000	0.	....	Initial load.
4,000	5,000	.0014	....	
8,000	10,000	.0033	.0019	
12,000	15,000	.0054	.0021	
16,000	20,000	.0076	.0022	
12,000	15,000	.0056	.0020	
16,000	20,000	.0076	.0020	
12,000	15,000	.0055	.0021	
8,000	10,000	.0038	.0017	
4,000	5,000	.0016	.0022	
800	1,000	0.	....	
Estimated temperature, 1269° Fahr. Expansion, ″.0782 in 10″.				
800	1,000	0.	0.	Initial load.
8,000	10,000	.0051	....	
800	1,000	.0045	....	
8,000	10,000	.0050	....	
800	1,000	.0046	....	E = 18,947,000 pounds per square inch.
8,000	10,000	.0046	....	
800	1,000	.0045	....	
8,000	10,000	.0049	....	
800	1,000	.0048	....	
800	1,000	0.	....	Initial load.
4,000	5,000	.0024	....	
8,000	10,000	.0055	....	
	10,000	.0064	....	After 2 minutes.
8,800	11,000	.0065	....	
	11,000	.0074	....	Do.
9,600	12,000	.0081	....	
	12,000	.0089	....	Do.

No. 3338—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
10,400	13,000	.0100	....	
	13,000	.0104	....	After 2 minutes.
12,000	15,000	.0134	....	
	15,000	.0149	....	Do.
14,400	18,000	.0199	....	
	18,000	.0239	....	After 3 minutes.
16,000	20,000	.0299	....	
	20,000	.0356	....	After 2 minutes.
	20,000	.0405	....	After 4 minutes.
	20,000	.0453	....	After 6 minutes.
	20,000	.0510	....	After 8 minutes.
	20,000	.0544	....	After 10 minutes.
Hot test discontinued. Total permanent set when cooled, ″.05. Temperature, 80°.				
800	1,000	0.	0.	Initial load.
4,000	5,000	.0016	....	
8,000	10,000	.0034	....	
12,000	15,000	.0051	....	
16,000	20,000	.0068	....	
20,000	25,000	.0087	....	
24,000	30,000	.0105	....	
28,000	35,000	.0121	....	
32,000	40,000	.0138	....	
16,000	20,000	.0070	....	
8,000	1,000	.0004	....	
28,000	35,000	.0122	....	
8,000	1,000	.0004	....	

Heads and part of stem cut off each end of specimen, and the middle part of stem tested by compression.

No. 3338*a*.

Length, 8″.
Diameter, 1″.005±.
Sectional area, .7934 square inch.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
793	1,000	0.	0.	Initial load.
3,967	5,000	.0006	....	
7,934	10,000	.0014	0.	
11,901	15,000	.0023	....	
15,868	20,000	.0030	0.	
19,835	25,000	.0039	....	
23,802	30,000	.0048	0.	
27,769	35,000	.0054	....	
31,736	40,000	.0064	0.	
35,703	45,000	.0072	....	
39,670	50,000	.0078	.0001	
43,637	55,000	.0089	.0001	
47,604	60,000	....	....	Elastic limit. Sudden yielding; load falls and specimen deflects.
57,920	73,000	....	....	Ultimate strength.

Failed by triple flexure.

No. 3339.

Marks, 10.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 10″.
Temperature, 79° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	Initial load.
8, 000	10, 000	.0032		
16, 000	20, 000	.0066		
24, 000	30, 000	.0101		
32, 000	40, 000	.0134		
16, 000	20, 000	.0066		
8, 000	1, 000	0.		
Bar now heated to an estimated temperature of 743° Fahr. Expansion, ″.0440 in 10″.				
800	1, 000	0.	0.	Initial load.
16, 000	20, 000	.0078		E = 23,750,000 pounds per square inch.
800	1, 000	.0079		
16, 000	20, 000	.0078		
800	1, 000	.0079		
16, 000	20, 000	.0080		
800	1, 000	.0081		
16, 000	20, 000	.0083		
800	1, 000	.0082		
800	1, 000	0.	0.	Initial load.
4, 000	5, 000	.0016		
8, 000	10, 000	.0036		
12, 000	15, 000	.0059		
16, 000	2, 0000	.0077		
20, 000	25, 000	.0099		
24, 000	30, 000	.0124		
25, 600	32, 000	.0132		
27, 200	34, 000	.0142		
28, 800	36, 000	.0154		Elastic limit.
30, 400	38, 000	.0190		
32, 000	40, 000	.0229		
33, 600	42, 000	.0270		
35, 200	44, 000	.0333		
36, 800	46, 000	.0410		
38, 400	48, 000	.0482		
40, 000	50, 000	.0594		
44, 000	55, 000	.0928		
48, 000	60, 000	.1286		
44, 000	55, 000	.1267		
40, 000	50, 000	.1239		
36, 000	45, 000	.1229		
32, 000	40, 000	.1214		
28, 000	35, 000	.1189		
24, 000	30, 000	.1165		
20, 000	25, 000	.1146		
16, 000	20, 000	.1132		
12, 000	15, 000	.1109		
8, 000	10, 000	.1085		
4, 000	5, 000	.1059		
800	1, 000	.1036		
16, 000	20, 000	.1119		
32, 000	40, 000	.1193		
16, 000	20, 000	.1120		
800	1, 000	.1037		
40, 000	50, 000	.1240		
800	1, 000	.1042		
Hot test discontinued. Total permanent set when cooled, ″.10½. Temperature, 86°.				
800	1, 000	0.	0.	Initial load.
8, 000	10, 000	.0033		
12, 000	15, 000	.0051		

No. 3339—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation and recovery.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
16,000	20,000	.0069	0.	
20,000	25,000	.0088	....	
24,000	30,000	.0104	....	
28,000	35,000	.0122	....	
32,000	40,000	.0140	....	
24,000	30,000	.0106	....	
16,000	20,000	.0070	....	
8,000	10,000	.0033	....	
4,000	5,000	.0015	....	
800	1,000	.0001	....	

Heads and part of stem cut off each end of specimen, and the middle part of stem tested by compression.

No. 3339*a*.

Length, 8″.
Diameter, 1″.004.
Sectional area, .7916 square inch.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
792	1,000	0.	0.	**Initial load.**
3,958	5,000	.0007	....	
7,916	10,000	.0015	0.	
11,874	15,000	.0024	....	
15,832	20,000	.0032	0.	
19,790	25,000	.0040	....	
23,748	30,000	.0048	0.	
27,706	35,000	.0057	....	
31,664	40,000	.0065	0.	
35,622	45,000	.0074	....	
39,580	50,000	.0082	.0001	
43,538	55,000	.0090	....	**Elastic limit. Sudden yielding after sustaining load 10 seconds.**
	55,000	.0164	.0075	**After 2 minutes.**
61,200	77,310	....	....	**Ultimate strength.**

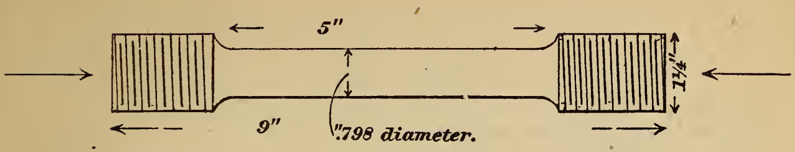
Failed by triple flexure.

TEMPERATURE TESTS.

MISCELLANEOUS BARS.

No. 3345.

Form of specimens.



Marks, 9.
Sectional area, .50 square inch.
Gauged length, 5″.
Ends faced off flat.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	Initial load.
2,500	5,000	.0007	....	
5,000	10,000	.0015	0.	
7,500	15,000	.0022	....	
10,000	20,000	.0030	0.	
15,000	30,000	.0048	....	
20,000	40,000	.0065	0.	
22,500	45,000	.0072	....	
25,000	50,000	.0080	....	
20,000	40,000	.0065	....	
15,000	30,000	.0048	....	
10,000	20,000	.0032	....	
5,000	10,000	.0015	0.	
26,000	52,000	.0083	....	
27,000	54,000	.0088	....	
28,000	56,000	.0090	....	
29,000	58,000	.0094	....	Elastic limit. Sustained load momentarily, then rapidly yielded, the load falling and the specimen deflecting.
29,000	58,000	.0594	....	
25,000	50,000	.0582	....	
20,000	40,000	.0566	....	
15,000	30,000	.0548	....	
10,000	20,000	.0530	....	
5,000	10,000	.0510	.0488	
5,000	10,000	.0502	....	
10,000	20,000	.0518	....	
15,000	30,000	.0536	....	
20,000	40,000	.0555	....	
25,000	50,000	.0575	....	
20,000	40,000	.0560	....	
15,000	30,000	.0543	....	
10,000	20,000	.0525	....	
5,000	10,000	.0507	.0488	

Compression test discontinued.
Permanent deflection, ″.01. V. Sine on chord of 5′.

Stem turned down to ″.7915 diameter for the purpose of straightening, and then tested by tension.

Interval of time between compression and tension tests, 13 days.

No. 3345*a*.

TENSION TEST.

Diameter, ″.7915.
Sectional area, .492 square inch.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
492	1,000	0.	0.	Initial load.
2,460	5,000	.0007	0.	
4,920	10,000	.0015	0.	
7,380	15,000	.0024	.0001	
9,840	20,000	.0033	.0001	
12,300	25,000	.0043	.0002	Elastic limit about 29,000 pounds per square inch.
14,760	30,000	.0060	.0012	
15,252	31,000	.0080	....	
15,744	32,000	.0097	....	
16,236	33,000	.0109	....	
16,728	34,000	.0117	....	
17,220	35,000	.0127	.0067	
19,680	40,000	.0205	....	
22,140	45,000	.0322	....	
24,600	50,000	.0465	....	
19,680	40,000	.0458	....	
14,760	30,000	.0440	....	
9,840	20,000	.0420	....	
4,920	10,000	.0398	.0380	
4,920	10,000	.0395	....	
9,840	20,000	.0413	....	
14,760	30,000	.0433	....	
19,680	40,000	.0454	....	
14,760	30,000	.0435	....	
9,840	20,000	.0417	....	
4,920	10,000	.0397	.0380	

Tensile test discontinued.

No. 3345*b*.

Compression test made 20 hours after above tension test.
Sectional area assumed to be .492 square inch, same as in tension test.
Gauged length, 5″.038.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
492	1,000	0.	0.	Initial load.
4,920	10,000	.0015	.0001	
9,840	20,000	.0033	.0003	
12,300	25,000	.0046	.0007	
14,760	30,000	.0069	.0020	Compression test discontinued.

No. 3355.

Second specimen from steel bar marked 9.
Same form as No. 3345.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	Initial load.
2,500	5,000	.0007		
5,000	10,000	.0015		
7,500	15,000	.0023		
10,000	20,000	.0033	0.	
12,500	25,000	.0041		
15,000	30,000	.0050	0.	
17,500	35,000	.0058		
20,000	40,000	.0067	0.	
22,500	45,000	.0076		
25,000	50,000	.0085	0.	
25,500	51,000	.0087		
26,000	52,000	.0088		
26,500	53,000	.0090		
27,000	54,000	.0092		
27,500	55,000	.0094		
28,000	56,000	.0096		
28,500	57,000	.0100		Elastic limit.
	Load fell.			
26,500	53,000	.0155		
27,000	54,000	.0357		
27,500	55,000	.0570		
28,000	56,000	.0608		
29,000	58,000	.0685		
30,000	60,000	.0790	.0065	
				Rested without load 15 hours.
500	1,000	......		
5,000	10,000	.0678		
10,000	20,000	.0697		
15,000	30,000	.0714		
20,000	40,000	.0733		
25,000	50,000	.0755		
30,000	60,000	.0782		
25,000	50,000	.0767		
20,000	40,000	.0749		
15,000	30,000	.0730		
10,000	20,000	.0709		
5,000	10,000	.0689	.0669	
30,000	60,000	.0785		
30,500	61,000	.0790		
	61,000	.0795	.0675	After 2 minutes.
31,000	62,000	.0805		
31,500	63,000	.0817		
32,000	64,000	.0955		
33,000	66,000	.1074		
34,000	68,000	.1219		
35,000	70,000	.1355		
30,000	60,000	.1338		
25,000	50,000	.1318		
20,000	40,000	.1298		
15,000	30,000	.1276		
10,000	20,000	.1252		
5,000	10,000	.1228	.1201	
5,000	10,000	.1215		
10,000	20,000	.1235		
15,000	30,000	.1255		
20,000	40,000	.1276		
25,000	50,000	.1299		
30,000	60,000	.1323		
25,000	50,000	.1305		
20,000	40,000	.1287		
15,000	30,000	.1267		
10,000	20,000	.1246		
5,000	10,000	.1223	.1202	

Test discontinued.

No. 3346.

Mark, 1.
Specimen same form as No. 3345.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 5″.
Ends faced off flat.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	Initial load.
5, 000	10, 000	.0015		
10, 000	20, 000	.0031		
15, 000	30, 000	.0048		
20, 000	40, 000	.0065		
25, 000	50, 000	.0082		
20, 000	40, 000	.0065		
15, 000	30, 000	.0049		
10, 000	20, 000	.0033		
5, 000	10, 000	.0015	0.	
26, 000	52, 000	.0085		
27, 000	54, 000	.0089		
28, 000	56, 000	.0093		Elastic limit. Load sustained momentarily then yielded rapidly under reduced load.
28, 000	56, 000	.1047		
25, 000	50, 000	.1040		
20, 000	40, 000	.1023		
15, 000	30, 000	.1005		
10, 000	20, 000	.0986		
5, 000	10, 000	.0966	.0947	
5, 000	10, 000	.0960		
10, 000	20, 000	.0977		
15, 000	30, 000	.0995		
20, 000	40, 000	.1014		
25, 000	50, 000	.1035		
20, 000	40, 000	.1019		
15, 000	30, 000	.1001		
10 100	20, 000	.0984		
5, 000	10, 000	.0965	.0948	

Compression test discontinued.

No. 3312.

Marks, 5.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 5″.
Temperature, 70° Fahr.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	2,000	0.	0.	Initial load.
5,000	10,000	.0014		
10,000	20,000	.0032		
15,000	30,000	.0050		
20,000	40,000	.0067		
25,000	50,000	.0085		
30,000	60,000	.0102		
31,000	62,000	.0107		
31,500	63,000	.0109		Elastic limit.
32,000	64,000			
Load fell.				
29,500	59,000	.0183		
30,000	60,000	.0970		
31,000	62,000	.1000		
32,000	64,000	.1155		
33,000	66,000	.1324		
34,000	68,000	.1480		
35,000	70,000	.1640		
36,000	72,000	.1836		
37,000	74,000	.20		
38,000	76,000	.215		
39,000	78,000	.26		
40,000	80,000	.29		
41,000	82,000	.33		
42,000	84,000	.38		
43,000	86,000	.42		
44,000	88,000	.58		
44,150	88,300	.62		
44,780	89,560	.94		Tensile strength.
34,700				At time of rupture.
0	0	1.29		=25.8 per cent.

Fractured 3″ from the neck. Appearance, fine silky.
Diameter at fracture, ″.55. Area, .238 square inch.
Contraction, 52.4 per cent.
Elongation of inch sections, ″.15, ″.23, ″55*, ″.21, ″.15.

JOURNAL OF RAILROAD AXLE.

SPECIMENS TAKEN OUT LONGITUDINALLY FROM THE FRACTURED JOURNAL OF A WROUGHT-IRON AXLE.

No. of test.	Diameter.	Sectional area.	Elastic limit.		Tensile strength.		Elongation in 2 inches.	
			Total.	Per square inch.	Total.	Per square inch.		
	Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per cent.*
2101	.505	.20	4, 700	23, 500	9, 660	48, 300	.53	26. 5
2102	.505	.20	4, 850	24, 250	9, 670	48, 350	.55	27. 5
2103	.505	.20	5, 060	25, 300	9, 720	48, 600	.44	22. 0

No. of test.	Diameter at fracture.	Area.	Contraction of area.	Elongation of inch sections.		Appearance of fracture.
	Inch.	*Sq. inch.*	*Per cent.*	*Inch.*	*Inch.*	
2101	.37	.1075	46. 2	.37*	.16	Fibrous.
2102	.39	.1194	40. 3	.36*	.19	Do.
2103	.38	.1134	43. 3	.36*	.08	Do.

STEEL RAILS.

TRANSVERSE TESTS.

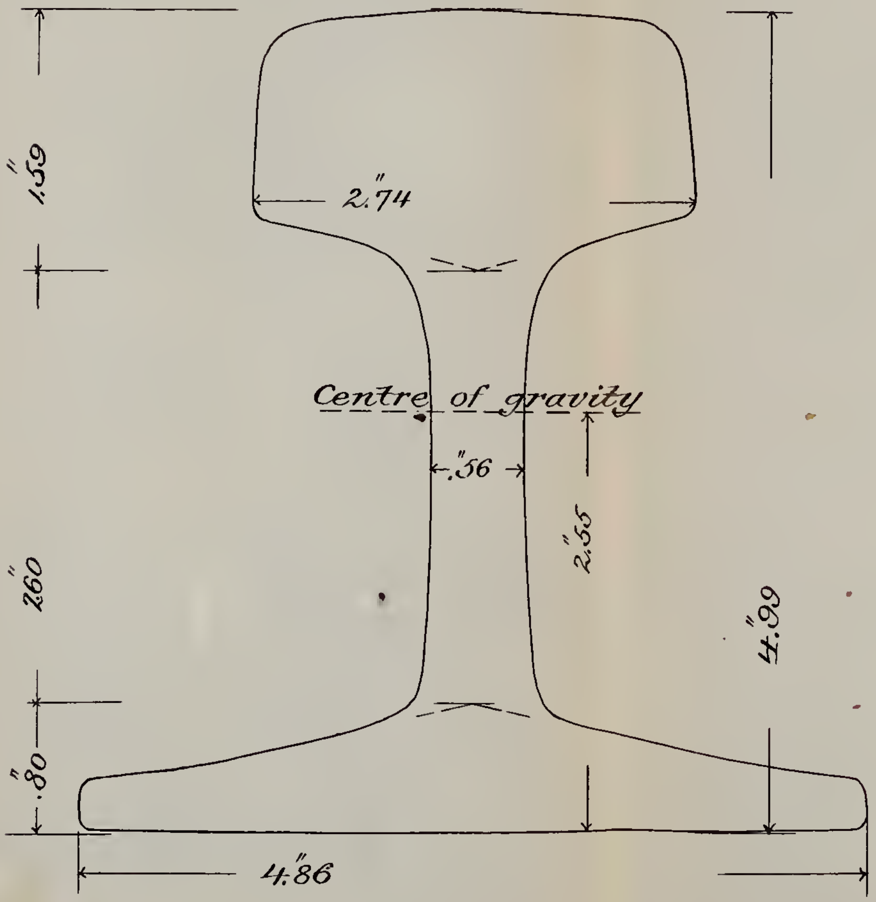
In addition to the measurement of the deflections and deflection sets, micrometer observations were taken showing the extension of the metal at the upper surface of the base of the rails, covering a section 6″ long, located opposite the middle bearing.

8

D

80 pounds New York Central steel rail.

Designed by P. H. Dudley, 1883.



No. 40.

EIGHTY POUNDS NEW YORK CENTRAL STEEL RAIL.

[Designed by P. H. Dudley.]

Troy manufacture, branded "A R I & S Co. Troy Steel 1884 23."
Loaded at the middle; supported at the ends 30″ apart.
Actual weight per yard, 80.7 pounds.

Applied loads.	Deflection.	Successive deflection.	Set.	Extension in 6″ of upper surface of edge of base.		Remarks.
				Extension.	Set.	
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	0.	0.	Initial load.
4,000	.0022	.0022				
6,000	.0048	.0026				
8,000	.0071	.0023				
10,000	.0091	.0020	.0005	.0011		
12,000	.0112	.0021				
14,000	.0133	.0021				
16,000	.0154	.0021				
18,000	.0175	.0021				
20,000	.0196	.0021	.0010	.0019		
22,000	.0218	.0022				
24,000	.0239	.0021				
26,000	.0258	.0019				
28,000	.0277	.0019				
30,000	.0300	.0023	.0013	.0028		
32,000	.0317	.0017				
34,000	.0338	.0021				
36,000	.0357	.0019				
38,000	.0381	.0024				
40,000	.0400	.0019	.0013	.0036		
42,000	.0419	.0019				
44,000	.0437	.0018				
46,000	.0458	.0021				
48,000	.0479	.0021				
50,000	.0498	.0019	.0020	.0048		
52,000	.0515	.0017				
54,000	.0535	.0020				
56,000	.0555	.0020				
58,000	.0575	.0020				
60,000	.0597	.0022	.0030	.0063		
62,000	.0621	.0024				
64,000	.0645	.0024				
66,000	.0667	.0022				
68,000	.0693	.0026				
70,000	.0722	.0029	.0054	.0085	.0018	
72,000	.0748	.0026				
74,000	.0772	.0024				
	.0780	.0008				After 2 minutes.
76,000	.0806	.0026				
	.0816	.0010				Do.
10,000						Remained under load 15 hours.
2,000			.0085			
78,000	.0831	.0015				
80,000	.0855	.0024	.0116	.0108		
82,000	.0912	.0047				
84,000	.0982	.0070				
86,000	.1032	.0050				
88,000	.1154	.0122				
90,000	.1326	.0172	.0447	.0226	.0127	
92,000	.1549	.0223				
94,000	.1709	.0160				
96,000	.1938	.0229				
98,000	.2195	.0257				
100,000	.2488	.0293	.1477			
110,000	.4125	.1637				
120,000	.6440	.2315	.5143		.1143	

Test discontinued.

No. 41.

OLD STEEL RAIL FROM BOSTON AND ALBANY RAILROAD.

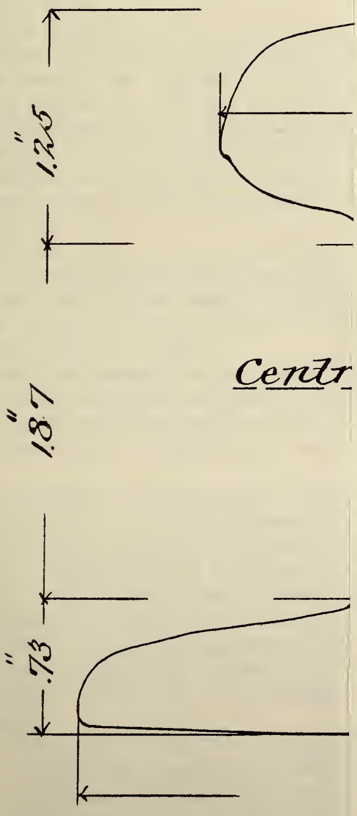
[Part of brand on the rail, which reads "Landore Siemen."]

Loaded at the middle; supported at the ends 30″ apart.
Weight per yard, 58.9 pounds.

Applied loads.	Deflection.	Successive deflection.	Set.	Extension in 6″ of upper surface of edge of base.		Remarks.
				Extension.	Set.	
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	0.	0.	Initial load.
4,000	.0058	.0058	....	....	....	
6,000	.0103	.0045	....	....	....	
8,000	.0150	.0047	....	....	....	
10,000	.0197	.0047	.0008	.0013	....	
12,000	.0241	.0044	....	....	....	
14,000	.0282	.0041	....	....	....	
16,000	.0327	.0045	....	....	....	
18,000	.0372	.0045	....	....	....	
20,000	.0417	.0045	.0019	.0027	....	
22,000	.0462	.0045	....	....	....	
24,000	.0506	.0044	....	....	....	
26,000	.0550	.0044	....	....	....	
28,000	.0594	.0044	....	....	....	
30,000	.0642	.0048	.0022	.0040	....	
32,000	.0691	.0049	....	....	....	
34,000	.0740	.0049	....	....	....	
36,000	.0810	.0070	....	....	....	
38,000	.0887	.0077	....	....	....	
40,000	.1029	.0142	.0190	.0104	.0042	
42,000	.1238	.0209	....	....	....	
44,000	.1549	.0311	....	....	....	
46,000	.1990	.0441	....	....	....	
48,000	.2430	.0440	....	....	....	
50,000	.3060	.0630	.1952	.0562	.0458	
52,000	.3540	.0480	....	....	....	
54,000	.4250	.0680	....	....	....	
56,000	.4870	.0620	....	....	....	
58,000	.5695	.0825	....	....	....	
60,000	.6560	.0865	.5163	....	.0952	

Test discontinued.

Old steel rai
& Albany Ra



No. 41.

OLD STEEL RAIL FROM BOSTON AND ALBANY RAILROAD.

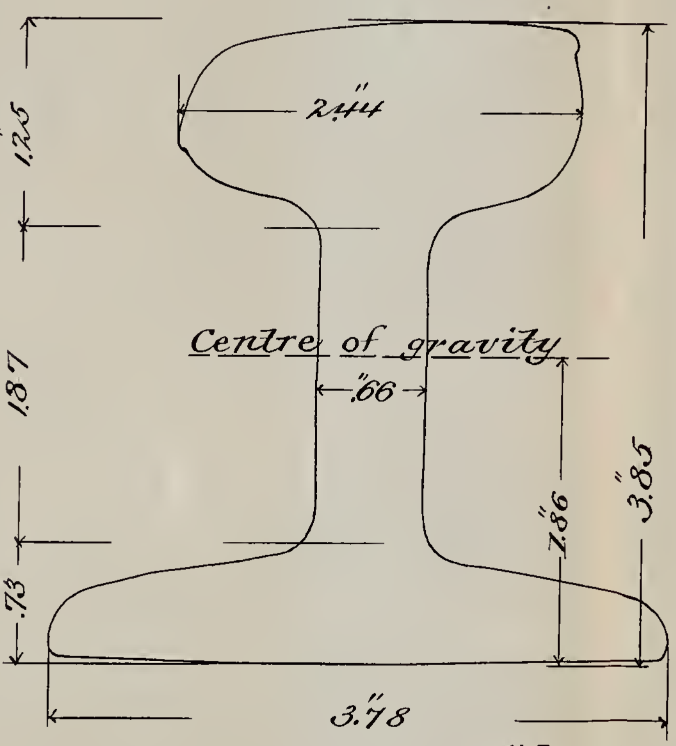
[Part of brand on the rail, which reads "Landore Siemen."]

Loaded at the middle; supported at the ends 30″ apart.
Weight per yard, 58.9 pounds.

Applied loads.	Deflection.	Successive deflection.	Set.	Extension in 6″ of upper surface of edge of base.		Remarks.
				Extension.	Set.	
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	0.	0.	Initial load.
4,000	.0058	.0058	....	....	....	
6,000	.0103	.0045	....	....	....	
8,000	.0150	.0047	....	....	....	
10,000	.0197	.0047	.0008	.0013	....	
12,000	.0241	.0044	....	....	....	
14,000	.0282	.0041	....	....	....	
16,000	.0327	.0045	....	....	....	
18,000	.0372	.0045	....	....	....	
20,000	.0417	.0045	.0019	.0027	....	
22,000	.0462	.0045	....	....	....	
24,000	.0506	.0044	....	....	....	
26,000	.0550	.0044	....	....	....	
28,000	.0594	.0044	....	....	....	
30,000	.0642	.0048	.0022	.0040	....	
32,000	.0691	.0049	....	....	....	
34,000	.0740	.0049	....	....	....	
36,000	.0810	.0070	....	....	....	
38,000	.0887	.0077	....	....	....	
40,000	.1029	.0142	.0190	.0104	.0042	
42,000	.1238	.0209	....	....	....	
44,000	.1549	.0311	....	....	....	
46,000	.1990	.0441	....	....	....	
48,000	.2430	.0440	....	....	....	
50,000	.3060	.0630	.1952	.0562	.0458	
52,000	.3540	.0480	....	....	....	
54,000	.4250	.0680	....	....	....	
56,000	.4870	.0620	....	....	....	
58,000	.5695	.0825	....	....	....	
60,000	.6560	.0865	.5163	....	.0952	

Test discontinued.

Old steel rail from the Boston & Albany Railroad.



base of the rail then followed, with the results given on the same diagram.

Measurements were made upon the base of a main switch rail, on a 5″ gauged length between ties, about 73″ from the end, at a low place which had been painted by the track inspection car.

On diagram No. 2 the strains are stated when the locomotive was advanced in position to bring the gauged length into the relative positions there shown; that is to say, when the front truck wheel was over the gauged length the extension of the metal in the base was ″.0010, then there was ″.0001 compression when the gauged length was between the truck wheels, and so on.

Observations made on the base of a stub switch rail 4⅛″ high, at a place midway two ties 23″ apart on centers, showed the metal in the gauged length of 5″ was extended as follows: Under the front truck wheel, ″.0010; under the rear truck wheel, ″.0011; under the front driver, ″.0019; under the rear driver, ″.0022.

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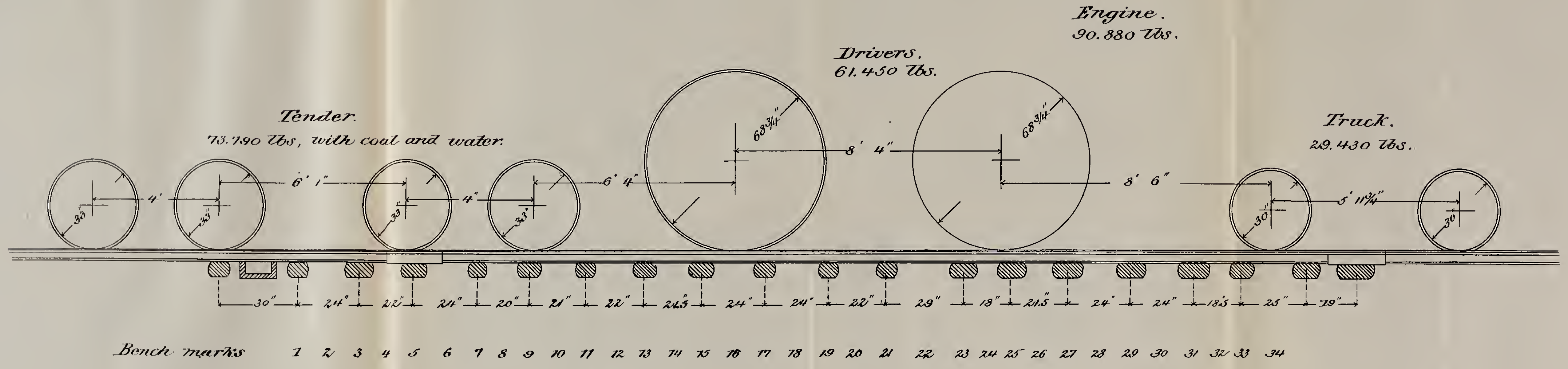
Observations made on the base of a stub switch rail 4⅛″ high, at a place midway two ties 23″ apart on centers, showed the metal in the gauged length of 5″ was extended as follows: Under the front truck wheel, ″.0010; under the rear truck wheel, ″.0011; under the front driver, ″.0019; under the rear driver, ″.0022.

Diagram 1.

Railroad track experiments

made at Allston, Mass, on track No. 1 North rail, Boston & Albany R.R. with locomotive No. 748.



Depression of rail, under the weight of the locomotive, opposite bench marks

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
				.1198	.1137	.1111	.1066	.0995	.0763	.0717	.0803	.0994	.1164	.1443	.1536	.1445	.1288	.1132	.1082	.1110	.1226	.1282	.1219	.1074	.0758	.0548	.0399	.0367					

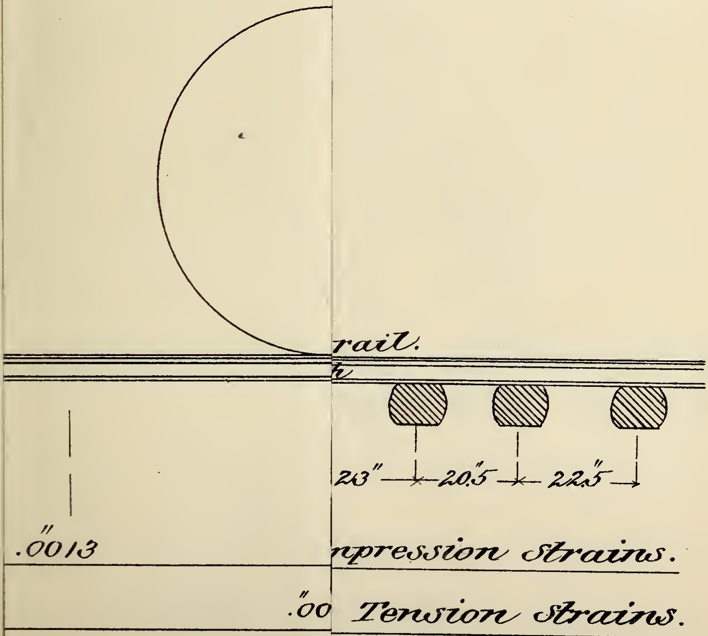
Strains in base of rail, measured on 5" gauged lengths, due the weight of the locomotive in the position above shown.

Bench marks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Compression strains	.0005		.0001				.0004				.0006	.0009	.0008	.0007					.0002	.0002							.0009	.0016	.0011	.0004	.0005			
Tension strains		.0001						.0011	.0010	.0005					.0009	.0020	.0006	.0003			.0000	.0003	.0005	.0012	.0012	.0005						.0002	.0008	.0003

m 2.

rack Experime

No. 1, Boston &

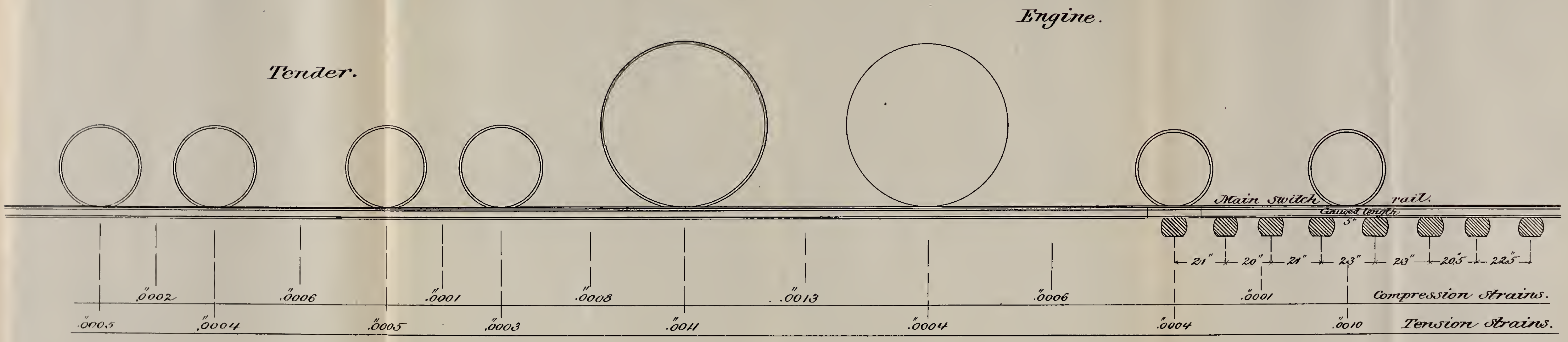


pper surface of the
strains of t

Diagram 2.

Railroad Track Experiments

made at Allston, Mass, on main switch rail, track No. 1, Boston & Albany R.R. with locomotive No. 148.

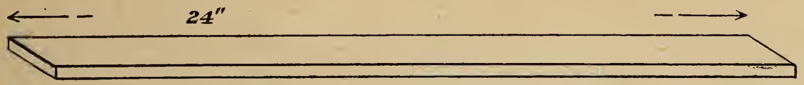


The strains were measured on the 5" gauged length on the upper surface of the base of the rail when the locomotive was in the relative positions indicated by the above recorded strains of tension and compression.

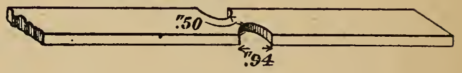
STEEL PLATES FROM THE NATIONAL ARMORY, SPRINGFIELD, MASS.

No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 8 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of 1-inch sections.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.						
		Inches.	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds*	*Pounds.*	*Inches.*	*Per ct.*	*In. In. Sq. in.*	*Per ct.*		" " " " " " " "
2452	1	1.500	.202	.303	14,080	46,470	21,040	69,440	1.55	19.4	1.29×.16=.206	32.0	Silky; broke at stamp mark on stem.	.15, .17, .18, .30*, .21, .21, .19, .14
2453	2	1.502	.198	.297	13,150	44,280	20,900	70,370	1.80	22.5	1.24×.13=,161	45.8	Silky	.19, .53*, .22, .19, .19, .17, .18, .13
2454	3	1.500	.210	.315	14,650	46,510	22,660	71,940	1.62	20.3	1.19×.15=.179	43.1	....do	.20, .49*, .18, .14, .16, .15, .17, .13
2455	4	1.501	.205	.308	14,680	47,660	22,050	71,590	1.98	24.8	1.22×.15=.183	40.6	....do	.16, .21, .21, .21, .24, .35, .45*, .15
2457	L	1.500	.204	.306	14,150	46,240	21,000	68,630	1.23	15.4	1.42×.18=.256	16.3	Silky serrated	.18, .15, .17, .15, .15, .15, .15, .15
2458	R	1.500	.195	.293	13,480	46,010	19,810	67,610	1.11	13.9	1,42×.17=.241	17.7	Silky serrated, seamy.	.19, .13, .14, .13, .13, .12, .15, .12

STEEL PLATE FROM WATERVLIET ARSENAL, WEST TROY, N. Y.

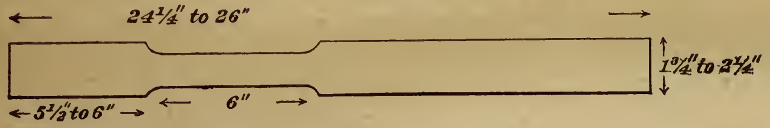


Nos. 2749a & 2750a.

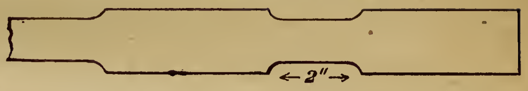


No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of 1-inch sections.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.						
		Inches.	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	*In.* *In.* *Sq. in.*	*Per ct.*		″ ″ ″ ″ ″ ″ ″ ″ ″ ″
2749	5	1.792	.404	.724	22,860	31,570	37,720	52,100	2.83	28.3	1.28 × .24 = .307	57.6	Silky	.21, .29, .75*, .30, .22, .22, .22, .22, .21, .19
2750	6	1.812	.397	.719	21,790	30,310	37,660	52,380	2.97	29.7	1.29 × .24 = .310	56.9	Silky seam at edge.	.27, .70*, .39, .25, .22, .23, .24, .23, .23, .21
2751	7	1.780	.391	.696	21,720	31,210	35,790	51,420	2.62	26.2	1.29 × .23 = .297	57.3	Silky	.23, .31, .73*, .27, .21, .19, .18, .17, .17, .16
2752	8	1.805	.402	.726	21,860	30,110	37,520	51,680	2.98	29.8	1.25 × .23 = .288	60.3	...do	.79*, .30, .24, .23, .20, .22, .24, .26, .25, .25
2753	9	1.761	.399	.703	22,640	32,200	37,290	53,040	2.51	25.1	1.27 × .22 = .279	60.3	...do	.40, .67*, .24, .22, .19, .18, .18, .14, .15, .14
2754	10	1.791	.397	.711	25,200	35,440	37,710	53,040	2.69	26.9	1.31 × .24 = .314	55.8	...do	.20, .18, .15, .19, .26, .70*, .33, .26, .21, .21
2755	11	1.790	.336	.601	18,460	30,720	32,060	53,340	2.99	29.9	1.26 × .21 = .265	55.9	...do	.23, .24, .25, .35, .74*, .28, .22, .21, .22, .25
2756	12	1.755	.342	.600	18,980	31,630	32,590	54,320	2.72	27.2	1.27 × .20 = .254	57.7	...do	.39, .66*, .27, .24, .22, .20, .20, .18, .18, .18
Fractured ends of specimens 5 and 6 prepared with grooved sides, water annealed, and then tested for tensile strength.														
2749a	....	.50	.366	.183	....	....	10,610	57,980	....	....	.37 × .21 = .078	57.4	Silky	
2750a	....	.50	.354	.177	....	....	10,790	60,960	....	....	.37 × .20 = .074	58.2	...do	
Fractured end of each specimen heated low cherry red, quenched in water, and bent double, cold, without fracture.														

STEEL PLATE FROM WATERVLIET ARSENAL, WEST TROY, N. Y.



Nos. 5710 to 5714.



No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 6 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of 1-inch sections.					
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.											
		Inches.	*Inch.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds*	*Pounds.*	*Inches.*	*Per ct.*	*In. In. Sq. in.*	*Per ct.*		"	"	"	"	"	"
2885	B 2	1.381	.392	.541	21,560	39,850	33,510	61,940	1.46	24.3	1.03×.24=.247	54.3	Silky	.14,	.15,	.13,	.27,	.57*,	.15
2886	B 4	1.377	.374	.515	19,380	37,630	32,140	62,410	1.61	26.8	1.02×.23=.235	54.4	....do	.18,	.55*,	.34,	.22,	.18.	.14
2887	B 6	1.379	.371	.512	20,200	39,450	33,490	65,410	1.68	28.0	1.02×.22=.224	56.2	....do	.17,	.21,	.23,	.30,	.58*,	.19
5705	1 A 1	1.376	.365	.502	20,160	40,160	30,180	60,120	1.60	26.7	1.04×.23=.239	52.4	....do	.17.	.20,	.26,	.58*,	.24,	.15
5706	2 A 2	1.381	.366	.505	20,050	39,700	31,060	61,500	1.44	24.0	1.04×.23=.239	52.8	....do	.13,	.14,	.17,	.25,	.58*,	.17
5707	6 A 6	1.378	.376	.518	21,920	42,320	32,370	62,490	1.57	26.2	1.05×.23=.242	53.3	....do	.14,	.18,	.21,	.25.	.61*,	.18
5708	1 X	1.497	.317	.475	19,520	41,090	30,910	65,070	1.61	26.8	1.13×.20=.226	52.4	....do	.16,	.25,	.61*,	.26,	.19,	.14
5709	2 X	1.498	.319	.478	18,170	38,010	30,980	64,810	1.73	28.8	1.12×.20=.224	53.1	....do	.18,	.24,	.61*,	.33,	.22,	.15

Supplementary tests. Specimens from longer heads of some of above fractured specimens prepared, having a reduced length of 2 inches, and about the same width as original specimens.

									Elongation in 2 inches.					
5710	1 A 1	1.387	.365	.506	....	....	31,670	62,590	.71	35.5	1.06×.23=.244	51.8	Silky	".33 ".38 *
5711	2 A 2	1.379	.355	.490	....	....	31,820	64,940	.61	30.5	1.08×.24=.259	47.1	....do	".34 ".27 *
5712	6 A 6	1.384	.374	.518	....	....	32,980	63,670	.69	34.5	1.06×.22=.233	55.0	....do	".47 ".22 *
5713	1 X	1.497	.308	.461	....	....	31,492	68,310	.62	31.0	1.19×.22=.262	43.2	....do	".32 ".30 *
5714	2 X	1.506	.312	.479	....	....	32,510	67,870	.62	31.0	1.19×.22=.262	45.3	....do	".32 ".30

STEEL SPECIMENS

FROM

FOUR BARS OF MIDVALE STEEL, FOR COMPARISON OF WATERTOWN ARSENAL AND MIDVALE TESTING MACHINES.

SPECIMENS FROM BAR NO. 1.

No. 3706.

Marks, $\overset{CT_1}{L_1}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000150	.000150	....	....	
2, 000	10, 000	.000350	.000200	....	....	
3, 000	15, 000	.000500	.000150	....	....	
4, 000	20, 000	.000650	.000150	....	....	
5, 000	25, 000	.000850	.000200	....	....	
6, 000	30, 000	.001000	.000150	....	....	
7, 000	35, 000	.001150	.000150	....	....	
8, 000	40, 000	.001350	.000200	....	....	Elastic limit.
8, 200	41, 000	.004500	.003150	....	....	
8, 400	42, 000	.012000	.007500	....	....	
8, 600	43, 000	.013000	.001000	....	....	
8, 800	44, 000	.014100	.001100	....	....	
9, 000	45, 000	.015300	.001200	....	....	
9, 200	46, 000	.016050	.000750	....	....	
9, 600	48, 000	.018400	.002350	....	....	
10, 000	50, 000	.020850	.002450	....	....	
10, 400	52, 000	.023750	.002900	....	....	
10, 800	54, 000	.026500	.002750	....	....	
11, 200	56, 000	.029400	.002900	....	....	
11, 600	58, 000	.032750	.003350	....	....	
12, 000	60, 000	.036500	.003750	....	....	
12, 400	62, 000	.040600	.004100	....	....	
12, 800	64, 000	.045600	.005000	....	....	
13, 200	66, 000	.051000	.005400	....	....	
13, 600	68, 000	.0550	.0040	....	....	
14, 000	70, 000	.0650	.0100	....	....	
14, 400	72, 000	.0700	.0150	....	....	
14, 800	74, 000	.0900	.0200	....	....	
15, 200	76, 000	.0150	.0250	....	....	
15, 460	77, 300	.1650	.0500	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77, 300
Elastic limit per square inch of original section	do...	40, 000
Elongation per inch after rupture	inch..	0. 2400
Elongation per inch under strain at elastic limit	do...	.001350
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per centum of original section		40. 3
Position of rupture		″.75 from the neck
Character of broken surface		silky
Elongation of inch sections		″.34*, ″.14

No. 3707.

Marks, $^{C\,T_1}_{\;L_3}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000150	.000150	....	....	
2, 000	10, 000	.000350	.000200	....	....	
3, 000	15, 000	.000500	.000150	....	....	
4, 000	20, 000	.000650	.000150	....	....	
5, 000	25, 000	.000800	.000150	....	....	
6, 000	30, 000	.001000	.000200	....	....	
7, 000	35, 000	.001150	.000150	....	....	
7, 400	37, 000	.001200	.000050	....	....	
7, 600	38, 000	.001250	.000050	....	....	
7, 800	39, 000	.001250	0.	....	....	Elastic limit.
8, 000	40, 000	.011250	.010000	....	....	
8, 400	42, 000	.012600	.001350	....	....	
8, 800	44, 000	.014600	.002000	....	....	
9, 200	46, 000	.016900	.002300	....	....	
9, 600	48, 000	.019000	.002100	....	....	
10, 000	50, 000	.021500	.002500	....	....	
10, 400	52, 000	.024250	.002750	....	....	
10, 800	54, 000	.026900	.002650	....	....	
11, 200	56, 000	.030100	.003200	....	....	
11, 600	58, 000	.033500	.003400	....	....	
12, 000	60, 000	.037250	.003750	....	....	
12, 400	62, 000	.041000	.003750	....	....	
12, 800	64, 000	.046850	.005850	....	....	
13, 200	66, 000	.052250	.005400	....	....	
13, 600	68, 000	.059000	.006750	....	....	
14, 000	70, 000	.068750	.009750	....	....	
14, 400	72, 000	.0850	.016250	....	....	
14, 800	74, 000	.0950	.0100	....	....	
15, 200	76, 000	.1350	.0400	....	....	
15, 360	76, 800	.1650	.0300	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section.......pounds..	76, 800
Elastic limit per square inch of original section.......do...	39, 000
Elongation per inch after rupture.......inch..	0. 2400
Elongation per inch under strain at elastic limit.......do...	.001250
Reduction in diameter at point of rupture.......do...	.105
Reduction in area after rupture, per centum of original section.......	37. 1
Position of rupture.......	″.90 from the neck
Character of broken surface.......	silky, 85 per cent.; granular, 15 per cent
Elongation of inch sections.......	″.31*, ″.17

No. 3708.

Marks, $\substack{C\,T_1 \\ L_{\circ}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	.0	.0	Initial load.
1,250	5,000	.000133	.000133			
2,500	10,000	.000300	.000167			
3,750	15,000	.000467	.000167			
5,000	20,000	.000633	.000166			
6,250	25,000	.000833	.000200			
7,500	30,000	.001067	.000234			
8,750	35,000	.001300	.000233			Elastic limit.
9,000	36,000	.003167	.001867			
9,250	37,000	.004667	.001500			
9,500	38,000	.008600	.003933			
9,750	39,000	.009333	.000733			
10,000	40,000	.010000	.000667			
10,500	42,000	.011933	.001933			
11,000	44,000	.013833	.001900			
11,500	46,000	.015833	.002000			
12,000	48,000	.017933	.002100			
12,500	50,000	.020400	.002467			
13,000	52,000	.022733	.002333			
13,500	54,000	.025600	.002867			
14,000	56,000	.028500	.002900			
14,500	58,000	.031667	.003167			
15,000	60,000	.035667	.004000			
15,500	62,000	.039333	.003666			
16,000	64,000	.044500	.005167			
16,500	66,000	.049167	.004667			
17,000	68,000	.0567	.007533			
17,500	70,000	.0633	.0066			
18,000	72,000	.0700	.0067			
18,500	74,000	.0933	.0233			
19,000	76,000	.1167	.0234			
19,420	77,680					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	77,680
Elastic limit per square inch of original section	do	35,000
Elongation per inch after rupture	inch	0.2400
Elongation per inch under strain at elastic limit	do	.001300
Reduction in diameter at point of rupture	do	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		1″.70 from the neck
Character of broken surface		silky, trace of granulation
Elongation of inch sections		″.17, ″.36*, ″.19

No. 3709.

Marks, $^{C\,T_1}_{\;L_7}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100			
2,500	10,000	.000300	.000200			
3,750	15,000	.000467	.000167			
5,000	20,000	.000600	.000133			
6,250	25,000	.000800	.000200			
7,500	30,000	.001000	.000200			
8,750	35,000	.001200	.000200			Elastic limit.
9,000	36,000	.004333	.003133			
9,250	37,000	.005500	.001167			
9,500	38,000	.008500	.003000			
9,750	39,000	.009000	.000500			
10,000	40,000	.010367	.001367			
10,500	42,000	.011933	.001566			
11,000	44,000	.014000	.002067			
11,500	46,000	.015933	.001933			
12,000	48,000	.018267	.002334			
12,500	50,000	.020500	.002233			
13,000	52,000	.023333	.002833			
13,500	54,000	.026000	.002667			
14,000	56,000	.029167	.003167			
14,500	58,000	.032500	.003333			
15,000	60,000	.036000	.003500			
15,500	62,000	.040333	.004333			
16,000	64,000	.045500	.005167			
16,500	66,000	.051000	.005500			
17,000	68,000	.057667	.006667			
17,500	70,000	.0667	.009033			
18,000	72,000	.0733	.0066			
18,500	74,000	.0933	.0200			
19,000	76,000	.1300	.0367			
19,170	76,680	.1733	.0433			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	76,680
Elastic limit per square inch of original section	do	35,000
Elongation per inch after rupture	inch	0.2567
Elongation per inch under strain at elastic limit	do	.001200
Reduction in diameter at point of rupture	do	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1″.80 from the neck
Character of broken surface		silky
Elongation of inch sections		″.19 ″.39*, ″ 19

SPECIMENS FROM BAR NO. 2.

No. 3710.

Marks, $^{C}\overset{T_2}{L_1}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	**Remarks.**
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000150	.000150	....	....	
2, 000	10, 000	.000250	.000100	....	....	
3, 000	15, 000	.000400	.000150	....	....	
4, 000	20, 000	.000600	.000200	....	....	
5, 000	25, 000	.000750	.000150	....	....	
6, 000	30, 000	.001000	.000250	....	....	
7, 000	35, 000	.001200	.000200	....	....	
8, 000	40, 000	.001300	.000100	....	....	
9, 000	45, 000	.001500	.000200	....	....	
10, 000	50, 000	.001650	.000150	....	....	
10, 200	51, 000	.001650	0.	....	....	
10, 400	52, 000	.001700	.000050	....	....	Elastic limit.
10, 600	53, 000	.001850	.000150	....	....	
10, 800	54, 000	.004250	.002400	....	....	
11, 000	55, 000	.006000	.001750	....	....	
11, 200	56, 000	.008400	.002400	....	....	
11, 600	58, 000	.010300	.001900	....	....	
12, 000	60, 000	.012500	.002200	....	....	
12, 400	62, 000	.015000	.002500	....	....	
12, 800	64, 000	.017500	.002500	....	....	
13, 200	66, 000	.020000	.002500	....	....	
13, 600	68, 000	.022500	.002500	....	....	
14, 000	70, 000	.025500	.003000	....	....	
14, 400	72, 000	.029000	.003500	....	....	
14, 800	74, 000	.032000	.003000	....	....	
15, 200	76, 000	.036250	.004250	....	....	
15, 600	78, 000	.040850	.004600	....	....	
16, 000	80, 000	.046000	.005150	....	....	
16, 400	82, 000	.054000	.008000	....	....	
16, 800	84, 000	.0615	.0075	....	....	
17, 200	86, 000	.0650	.0035	....	....	
17, 600	88, 000	.0950	.0300	....	....	
17, 760	88, 800	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88, 800
Elastic limit per square inch of original section	do...	52, 000
Elongation per inch after rupture	inch..	0. 2500
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per centum of original section		57. 2
Position of rupture		″.80 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.39, ″.11

No. 3711.

Marks, $\underset{L_3}{C\,T_2}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	....	....	
2, 000	10, 000	.000250	.000150	....	....	
3, 000	15, 000	.000450	.000200	....	....	
4, 000	20, 000	.000600	.000150	....	....	
5, 000	25, 000	.000800	.000200	....	....	
6, 000	30, 000	.001000	.000200	....	....	
7, 000	35, 000	.001150	.000150	....	....	
8, 000	40, 000	.001300	.000150	....	....	
9, 000	45, 000	.001450	.000150	....	....	
10, 000	50, 000	.001550	.000100	....	....	
10, 200	51, 000	.001550	0.	....	....	
10, 400	52, 000	.001600	.000050	....	....	
10, 600	53, 000	.001650	.000050	....	....	
10, 800	54, 000	.001700	.000050	....	....	
11, 000	55, 000	.001700	0.	....	....	
11, 200	56, 000	.001850	.000150	....	....	Elastic limit.
11, 400	57, 000	.010500	.008650	....	....	
11, 600	58, 000	.011250	.000750	....	....	
12, 000	60, 000	.013350	.002100	....	....	
12, 400	62, 000	.015600	.002250	....	....	
12, 800	64, 000	.018000	.002400	....	....	
13, 200	66, 000	.020600	.002600	....	....	
13, 600	68, 000	.023350	.002750	....	....	
14, 000	70, 000	.026250	.002900	....	....	
14, 400	72, 000	.029500	.003250	....	....	
14, 800	74, 000	.033000	.003500	....	....	
15, 200	76, 000	.037050	.004050	....	....	
15, 600	78, 000	.042000	.004950	....	....	
16, 000	80, 000	.047000	.005000	....	....	
16, 400	82, 000	.053750	.006750	....	....	
16, 800	84, 000	.062500	.008750	....	....	
17, 200	86, 000	.074500	.012000	....	....	
17, 600	88, 000	.0850	.0105	....	....	
17, 840	89, 200	.1400	.0550	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89, 200
Elastic limit per square inch of original section	do...	56, 000
Elongation per inch after rupture	inch..	0. 2650
Elongation per inch under strain at elastic limit	do...	.001850
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per centum of original section		59. 8
Position of rupture		1″.15 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.24, ″.29

No. 3712.

Marks, $\genfrac{}{}{0pt}{}{\mathrm{C\,T_2}}{\mathrm{L_5}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	....	....	
2,500	10,000	.000267	.000134	....	....	
3,750	15,000	.000433	.000166	....	....	
5,000	20,000	.000600	.000167	....	....	
6,250	25,000	.000733	.000133	....	....	
7,500	30,000	.000933	.000200	....	....	
8,750	35,000	.001067	.000134	....	....	
10,000	40,000	.001233	.000166	....	....	
11,250	45,000	.001367	.000134	....	....	
12,500	50,000	.001533	.000166	....	....	
12,750	51,000	.001567	.000034	....	....	
13,000	52,000	.001633	.000066	....	....	
13,250	53,000	.001667	.000034	....	....	
13,500	54,000	.001700	.000033	....	....	
13,750	55,000	.001733	.000033	....	....	Elastic limit.
14,000	56,000	.007667	.005934	....	....	
14,250	57,000	.008600	.000933	....	....	
14,500	58,000	.009433	.000833	....	....	
15,000	60,000	.011600	.002167	....	....	
15,500	62,000	.014167	.002567	....	....	
16,000	64,000	.016200	.002033	....	....	
16,500	66,000	.018400	.002200	....	....	
17,000	68,000	.021167	.002767	....	....	
17,500	70,000	.023833	.002666	....	....	
18,000	72,000	.026667	.002834	....	....	
18,500	74,000	.029933	.003266	....	....	
19,000	76,000	.033667	.003734	....	....	
19,500	78,000	.038000	.004333	....	....	
20,000	80,000	.042833	.004833	....	....	
20,500	82,000	.048333	.005500	....	....	
21,000	84,000	.054667	.006334	....	....	
21,500	86,000	.0633	.008633	....	....	
22,000	88,000	.0767	.0134	....	....	
22,490	89,960	.1333	.0566	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,960
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	0.2300
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.194
Reduction in area after rupture, per centum of original section		57.0
Position of rupture		1″.25 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.29*, ″.30, ″.10

No. 3713.

Marks, $^{C}\mathrm{T}_{2}\,{}_{\mathrm{L}_{7}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	....	....	
2, 500	10, 000	.000267	.000167	....	....	
3, 750	15, 000	.000433	.000166	....	....	
5, 000	20, 000	.000600	.000167	....	....	
6, 250	25, 000	.000767	.000167	....	....	
7, 500	30, 000	.000933	.000166	....	....	
8, 750	35, 000	.001100	.000167	....	....	
10, 000	40, 000	.001267	.000167	....	....	
11, 250	45, 000	.001433	.000166	....	....	
12, 500	50, 000	.001600	.000167	....	....	
13, 000	52, 000	.001667	.000067	....	....	
13, 250	53, 000	.001700	.000033	....	....	
13, 500	54, 000	.001733	.000033	....	....	Elastic limit.
13, 750	55, 000	.005500	.003767	....	....	
14, 000	56, 000	.008000	.002500	....	....	
14, 500	58, 000	.011167	.003167	....	....	
15, 000	60, 000	.013233	.002066	....	....	
15, 500	62, 000	.015500	.002267	....	....	
16, 000	64, 000	.017600	.002100	....	....	
16, 500	66, 000	.020067	.002467	....	....	
17, 000	68, 000	.022667	.002600	....	....	
17, 500	70, 000	.025667	.003000	....	....	
18, 000	72, 000	.028600	.002933	....	....	
18, 500	74, 000	.032667	.004067	....	....	
19, 000	76, 000	.036167	.003500	....	....	
19, 500	78, 000	.040433	.004266	....	....	
20, 000	80, 000	.046167	.005734	....	....	
20, 500	82, 000	.053733	.007566	....	....	
21, 000	84, 000	.0633	.009567	....	....	
21, 500	86, 000	.0700	.0067	....	....	
22, 000	88, 000	.1033	.0333	....	....	
22, 230	88, 920	.1433	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88, 900
Elastic limit per square inch of original section	do...	54, 200
Elongation per inch after rupture	inch..	0. 2300
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.204
Reduction in area after rupture, per centum of original section		59. 3
Position of rupture		1″.10 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.41*, ″.17, ″.11

No. 3722.

Marks, $\overset{C\,T_2}{L_9}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000175	.000175			
2,500	10,000	.000375	.000200			
3,750	15,000	.000525	.000150			
5,000	20,000	.000700	.000175			
6,250	25,000	.000875	.000175			
7,500	30,000	.001025	.000150			
8,750	35,000	.001200	.000175			
10,000	40,000	.001350	.000150			
11,250	45,000	.001500	.000150			
12,500	50,000	.001700	.000200			
13,000	52,000	.001750	.000050			
13,500	54,000	.001800	.000050			
13,750	55,000	.001825	.000025			Elastic limit.
14,000	56,000	.001900	.000075			
14,250	57,000	.001975	.000075			
14,500	58,000	.009875	.007900			
15,000	60,000	.011625	.001750			
15,500	62,000	.013450	.001825			
16,000	64,000	.015750	.002300			
16,500	66,000	.017875	.002125			
17,000	68,000	.020500	.002625			
17,500	70,000	.022925	.002425			
18,000	72,000	.025625	.002700			
18,500	74,000	.028625	.003000			
19,000	76,000	.031750	.003125			
19,500	78,000	.035750	.004000			
20,000	80,000	.039500	.003750			
20,500	82,000	.0450	.0055			
21,000	84,000	.0500	.0050			
21,500	86,000	.0575	.0075			
22,000	88,000	.0700	.0125			
22,500	90,000	.0900	.0200			
22,750	91,000	.1125	.0225			Tensile strength.

General summary.

Tensile strength per square inch of original section……pounds..	91,000
Elastic limit per square inch of original section……do…	55,000
Elongation per inch after rupture……inch..	0.1850
Elongation per inch under strain at elastic limit……do…	.001825
Reduction in diameter at point of rupture……do…	.194
Reduction in area after rupture, per centum of original section……	57.0
Position of rupture……	1″ from neck
Character of broken surface……	fine silky
Elongation of inch sections……	″.39, ″.16, ″.11, ″.08

No. 3723.

Marks, $C\frac{T_2}{L_{11}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000175	.000175	....	....	
2,500	10,000	.000375	.000200	....	....	
3,750	15,000	.000550	.000175	....	....	
5,000	20,000	.000700	.000150	....	....	
6,250	25,000	.000900	.000200	....	....	
7,500	30,000	.001025	.000125	....	....	
8,750	35,000	.001200	.000175	....	....	
10,000	40,000	.001350	.000150	....	....	
11,250	45,000	.001525	.000175	....	....	
12,500	50,000	.001700	.000175	....	....	
13,000	52,000	.001725	.000025	....	....	
13,250	53,000	.001775	.000050	....	....	Elastic limit.
13,500	54,000	.002025	.000250	....	....	
13,750	55,000	.003875	.001850	....	....	
14,000	56,000	.006000	.002125	....	....	
14,500	58,000	.009950	.003950	....	....	
15,000	60,000	.012000	.002050	....	....	
15,500	62,000	.014200	.002200	....	....	
16,000	64,000	.016500	.002300	....	....	
16,500	66,000	.018625	.002125	....	....	
17,000	68,000	.021000	.002375	....	....	
17,500	70,000	.023875	.002875	....	....	
18,000	72,000	.026700	.002825	....	....	
18,500	74,000	.030000	.003300	....	....	
19,000	76,000	.033500	.003500	....	....	
19,500	78,000	.037500	.004000	....	....	
20,000	80,000	.042250	.004750	....	....	
20,500	82,000	.048125	.005875	....	....	
21,000	84,000	.054750	.006625	....	....	
21,500	86,000	.0675	.012750	....	....	
22,000	88,000	.0775	.0100	....	....	
22,410	89,640	.1175	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	89,640
Elastic limit per square inch of original section	do	53,000
Elongation per inch after rupture	inch	0.1750
Elongation per inch under strain at elastic limit	do	.001775
Reductiod in diameter at point of rupture	do	.194
Reduction in area after rupture, per centum of original section		57.0
Position of rupture		″.85 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.40*, ″.13, ″.09, ″.08

SPECIMENS FROM BAR No. 3.

No. 3714.

Marks, $^{C\,T_3}_{L_1}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	....	....	
2,000	10,000	.000300	.000200	....	....	
3,000	15,000	.000450	.000150	....	....	
4,000	20,000	.000600	.000150	....	....	
5,000	25,000	.000850	.000250	....	....	
6,000	30,000	.001000	.000150	....	....	
7,000	35,000	.001100	.000100	....	....	
8,000	40,000	.001300	.000200	....	....	
9,000	45,000	.001450	.000150	....	....	
10,000	50,000	.001600	.000150	....	....	
11,000	55,000	.001800	.000200	....	....	
12,000	60,000	.001900	.000100	....	....	
13,000	65,000	.002100	.000200	....	....	Elastic limit.
13,200	66,000	.003750	.001650	....	....	
13,400	67,000	.006400	.002650	....	....	
13,600	68,000	.007100	.000700	....	....	
14,000	70,000	.010000	.002900	....	....	
14,400	72,000	.011750	.001750	....	....	
14,800	74,000	.013750	.002000	....	....	
15,200	76,000	.015500	.001750	....	....	
15,600	78,000	.017500	.002000	....	....	
16,000	80,000	.019750	.002250	....	....	
16,400	82,000	.022000	.002250	....	....	
16,800	84,000	.024600	.002600	....	....	
17,200	86,000	.027400	.002800	....	....	
17,600	88,000	.030250	.002850	....	....	
18,000	90,000	.034000	.003750	....	....	
18,800	94,000	.0400	.0060	....	....	
19,600	98,000	.0500	.0100	....	....	
20,400	102,000	.0850	.0350	....	....	
20,640	103,200	.1350	.0500	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,200
Elastic limit per square inch of original section	do...	65,000
Elongation per inch after rupture	inch..	0.2450
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per centum of original section		57.2
Position of rupture		1″.10 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.15, ″.34*

No. 3715.

Marks, $^{C\,T_3}_{\;L_3}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	....	....	
2,000	10,000	.000300	.000200	....	....	
3,000	15,000	.000400	.000100	....	....	
4,000	20,000	.000550	.000150	....	....	
5,000	25,000	.000750	.000200	....	....	
6,000	30,000	.001000	.000250	....	....	
7,000	35,000	.001100	.000100	....	....	
8,000	40,000	.001300	.000200	....	....	
9,000	45,000	.001450	.000150	....	....	
10,000	50,000	.001600	.000150	....	....	
11,000	55,000	.001800	.000200	....	....	
12,000	60,000	.001950	.000150	....	....	
12,400	62,000	.002000	.000050	....	....	
12,800	64,000	.002050	.000050	....	....	Elastic limit.
13,000	65,000	.002150	.000100	....	....	
13,200	66,000	.002350	.000200	....	....	
13,600	68,000	.005450	.003100	....	....	
14,000	70,000	.008750	.003300	....	....	
14,400	72,000	.010850	.002100	....	....	
14,800	74,000	.012800	.001950	....	....	
15,200	76,000	.014750	.001950	....	....	
15,600	78,000	.017000	.002250	....	....	
16,000	80,000	.019250	.002250	....	....	
16,400	82,000	.021750	.002500	....	....	
16,800	84,000	.024350	.002600	....	....	
17,200	86,000	.026900	.002550	....	....	
17,600	88,000	.029800	.002900	....	....	
18,000	90,000	.032750	.002950	....	....	
18,400	92,000	.036800	.004050	....	....	
18,800	94,000	.041000	.004200	....	....	
19,200	96,000	.046500	.005500	....	....	
19,600	98,000	.052500	.006000	....	....	
20,000	100,000	.064000	.011500	....	....	
20,400	102,000	.0850	.0210	....	....	
20,620	103,100	.1150	.0300	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,100
Elastic limit per square inch of original section	do...	64,000
Elongation per inch after rupture	inch..	0.2450
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per centum of original section		57.2
Position of rupture		1″.25 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.27*, ″.22

No. 3716.

Marks, $\overset{CT_3}{L_5}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133			
2,500	10,000	.000333	.000200			
3,750	15,000	.000467	.000134			
5,000	20,000	.000633	.000166			
6,250	25,000	.000800	.000167			
7,500	30,000	.000967	.000167			
8,750	35,000	.001100	.000133			
10,000	40,000	.001267	.000167			
11,250	45,000	.001433	.000166			
12,500	50,000	.001633	.000200			
13,750	55,000	.001767	.000134			
15,000	60,000	.001933	.000166			
15,500	62,000	.002000	.000067			
16,000	64,000	.002067	.000067			
16,250	65,000	.002100	.000033			Elastic limit.
16,500	66,000	.002333	.000233			
16,750	67,000	.005733	.003400			
17,000	68,000	.007233	.001500			
17,500	70,000	.009500	.002267			
18,000	72,000	.011667	.002167			
18,500	74,000	.013500	.001833			
19,000	76,000	.015600	.002100			
19,500	78,000	.017333	.001733			
20,000	80,000	.019833	.002500			
20,500	82,000	.022333	.002500			
21,000	84,000	.024600	.002267			
21,500	86,000	.027333	.002733			
22,000	88,000	.030333	.003000			
22,500	90,000	.034000	.003667			
23,000	92,000	.038167	.004167			
23,500	94,000	.042333	.004166			
24,000	96,000	.047833	.005500			
24,500	98,000	.055000	.007167			
25,000	100,000	.0633	.0083			
25,500	102,000	.0933	.0300			
25,660	102,640	.1100	.0167			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102,640
Elastic limit per square inch of original section	do...	65,000
Elongation per inch after rupture	inch..	.02200
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.204
Reduction in area after rupture, per centum of original section		59.3
Position of rupture		1″.60 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.12, ″*.41, ″.13

No. 3717.

Marks, $\overset{C}{}\overset{T_3}{}\underset{L_7}{}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000133	.000133	....	....	
2, 500	10, 000	.000300	.000167	....	....	
3, 750	15, 000	.000433	.000133	....	....	
5, 000	20, 000	.000600	.000167	....	....	
6, 250	25, 000	.000767	.000167	....	....	
7, 500	30, 000	.000933	.000166	....	....	
8, 750	35, 000	.001100	.000167	....	....	
10, 000	40, 000	.001267	.000167	....	....	
11, 250	45, 000	.001400	.000133	....	....	
12, 500	50, 000	.001600	.000200	....	....	
13, 750	55, 000	.001767	.000167	....	....	
15, 000	60, 000	.001900	.000133	....	....	
15, 500	62, 000	.002000	.000100	....	....	
16, 000	64, 000	.002033	.000033	....	....	
16, 500	66, 000	.002100	.000067	....	....	Elastic limit.
16, 750	67, 000	.002467	.000367	....	....	
17, 000	68, 000	.006000	.003533	....	....	
17, 500	70, 000	.008233	.002233	....	....	
18, 000	72, 000	.010567	.002334	....	....	
18, 500	74, 000	.012500	.001933	....	....	
19, 000	76, 000	.014533	.002033	....	....	
19, 500	78, 000	.016567	.002034	....	....	
20, 000	80, 000	.018667	.002067	....	....	
20, 500	82, 000	.021333	.002666	....	....	
21, 000	84, 000	.023733	.002400	....	....	
21, 500	86, 000	.026333	.002600	....	....	
22, 000	88, 000	.029333	.003000	....	....	
22, 500	90, 000	.032667	.003334	....	....	
23, 000	92, 000	.036667	.004000	....	....	
23, 500	94, 000	.041333	.004666	....	....	
24, 000	96, 000	.046167	.004834	....	....	
24, 500	98, 000	.053000	.006833	....	....	
25, 000	100, 000	.0633	.0103	....	....	
25, 500	102, 000	.0767	.0134	....	....	
25, 710	102, 840	.1100	.0333	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102, 840
Elastic limit per square inch of original section	do...	66, 000
Elongation per inch after rupture	inch..	0. 2067
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.204
Reduction in area after rupture, per centum of original section		59. 3
Position of rupture		1″.40 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.11, ″.36, * .″15

No. 3724.

Marks, $\overset{C\,T_3}{L_9}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000125	.000125	....	....	
2, 500	10, 000	.000275	.000150	....	....	
3, 750	15, 000	.000450	.000175	....	....	
5, 000	20, 000	.000625	.000175	....	....	
6, 250	25, 000	.000750	.000125	....	....	
7, 500	30, 000	.000925	.000175	....	....	
8, 750	35, 000	.001100	.000175	....	....	
10, 000	40, 000	.001250	.000150	....	....	
11, 250	45, 000	.001450	.000200	....	....	
12, 500	50, 000	.001650	.000200	....	....	
13, 750	55, 000	.001775	.000125	....	....	
15, 000	60, 000	.001975	.000200	....	....	
15, 500	62, 000	.002025	.000050	....	....	
15, 750	63, 000	.002075	.000050	....	....	Elastic limit.
16, 000	64, 000	.002150	.000075	....	....	
16, 250	65, 000	.002675	.000525	....	....	
16, 500	66, 000	.005000	.002325	....	....	
17, 000	68, 000	.008500	.003500	....	....	
17, 500	70, 000	.010300	.001800	....	....	
18, 000	72, 000	.012200	.001900	....	....	
18, 500	74, 000	.014250	.002025	....	....	
19, 000	76, 000	.016250	.002000	....	....	
19, 500	78, 000	.018375	.002125	....	....	
20, 000	80, 000	.020875	.002500	....	....	
20, 500	82, 000	.023250	.002375	....	....	
21, 000	84, 000	.026000	.002750	....	....	
21, 500	86, 000	.028950	.002950	....	....	
22, 000	88, 000	.032000	.003050	....	....	
22, 500	90, 000	.036000	.004000	....	....	
23, 000	92, 000	.0400	.0040	....	....	
23, 500	94, 000	.0450	.0050	....	....	
24, 000	96, 000	.0525	.0075	....	....	
24, 500	98, 000	.0600	.0075	....	....	
25, 000	100, 000	.0750	.0150	....	....	
25, 410	101, 640	.1275	.0525	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101, 640
Elastic limit per square inch of original section	do...	63, 000
Elongation per inch after rupture	inch..	0. 2025
Elongation per inch under strain at elastic limit	do...	.002075
Reduction in diameter at point of rupture	do...	.204
Reduction in area after rupture, per centum of original section		59. 3
Position of rupture		2″.2 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.11, ″.17, ″.42*, ″.11

No. 3725.

Marks, $^{C\,T_3}_{L_{11}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000175	.000175			
2,500	10,000	.000375	.000200			
3,750	15,000	.000550	.000175			
5,000	20,000	.000700	.000150			
6,250	25,000	.000875	.000175			
7,500	30,000	.001050	.000175			
8,750	35,000	.001200	.000150			
10,000	40,000	.001350	.000150			
11,250	45,000	.001500	.000150			
12,500	50,000	.001675	.000175			
13,750	55,000	.001900	.000225			
15,000	60,000	.002000	.000100			
15,250	61,000	.002050	.000050			
15,500	62,000	.002100	.000050			
15,750	63,000	.002175	.000075			
16,000	64,000	.002200	.000025			Elastic limit.
16,250	65,000	.002275	.000075			
16,500	66,000	.002925	.000650			
17,000	68,000	.007750	.004825			
17,500	70,000	.009500	.001750			
18,000	72,000	.011700	.002200			
18,500	74,000	.014000	.002300			
19,000	76,000	.016000	.002000			
19,500	78,000	.018125	.002125			
20,000	80,000	.020500	.002375			
20,500	82,000	.022750	.002250			
21,000	84,000	.025005	.002250			
21,500	86,000	.028125	.003125			
22,000	88,000	.031175	.003050			
22,500	90,000	.034900	.003725			
23,000	92,000	.037925	.003025			
23,500	94,000	.044500	.006575			
24,000	96,000	.050625	.006125			
24,500	98,000	.0575	.006875			
25,000	100,000	.0725	.0150			
25,360	101,440	.1050	.0325			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,440
Elastic limit per square inch of original section	do...	64,000
Elongation per inch after rupture	inch..	0.1950
Elongation per inch under strain at elastic limit	do...	.002200
Reduction in diameter at point of rupture	do...	.204
Reduction in area after rupture, per centum of original section		59.3
Position of rupture		2″.25 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.11, ″.18, ″.38*, ″.11

SPECIMENS FROM BAR NO. 4.

No. 3718.

Marks, $\overset{C\,T_4}{L_1}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	....	....	
2,000	10,000	.000300	.000200	....	....	
3,000	15,000	.000450	.000150	....	....	
4,000	20,000	.000650	.000200	....	....	
5,000	25,000	.000800	.000150	....	....	
6,000	30,000	.001000	.000200	....	....	
7,000	35,000	.001150	.000150	....	....	
8,000	40,000	.001350	.000200	....	....	
9,000	45,000	.001500	.000150	....	....	
10,000	50,000	.001650	.000150	....	....	
11,000	55,000	.001850	.000200	....	....	
12,000	60,000	.002000	.000150	....	....	
12,800	64,000	.002100	.000100	....	....	
13,600	68,000	.002300	.000200	....	....	
14,000	70,000	.002350	.000050	....	....	
14,800	74,000	.002500	.000150	....	....	
15,000	75,000	.002550	.000050	....	....	Elastic limit.
15,200	76,000	.002750	.000200	....	....	
15,400	77,000	.004250	.001500	....	....	
15,600	78,000	.005850	.001600	....	....	
16,000	80,000	.007750	.001900	....	....	
16,400	82,000	.009750	.002000	....	....	
16,800	84,000	.011500	.001750	....	....	
17,200	86,000	.013400	.001900	....	....	
17,600	88,000	.015000	.001600	....	....	
18,000	90,000	.016850	.001850	....	....	
18,400	92,000	.019000	.002150	....	....	
18,800	94,000	.021250	.002250	....	....	
19,200	96,000	.023400	.002150	....	....	
19,600	98,000	.026000	.002600	....	....	
20,000	100,000	.028750	.002750	....	....	
20,400	102,000	.031400	.002650	....	....	
20,800	104,000	.034500	.003100	....	....	
21,200	106,000	.038500	.004000	....	....	
21,600	108,000	.042600	.004100	....	....	
22,000	110,000	.0500	.0074	....	....	
22,400	112,000	.0550	.0050	....	....	
22,800	114,000	.0650	.0100	....	....	
23,200	116,000	.1000	.0350	....	....	
23,210	116,050	.1100	.0100	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	116,050
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	0.2250
Elongation per inch under strain at elastic limit	do...	.002550
Reduction in diameter at point of rupture		.155
Reduction in area after rupture, per centum of original section		51.9
Position of rupture		″.95 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.33*, ″.12

No. 3719.

Marks, $^{\mathrm{C}\,\mathrm{T}_4}_{\quad\mathrm{L}_3}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	....	....	
2,000	10,000	.000300	.000200	....	....	
3,000	15,000	.000450	.000150	....	....	
4,000	20,000	.000650	.000200	....	....	
5,000	25,000	.000850	.000200	....	....	
6,000	30,000	.001000	.000150	....	....	
7,000	35,000	.001150	.000150	....	....	
8,000	40,000	.001350	.000200	....	....	
9,000	45,000	.001500	.000150	....	....	
10,000	50,000	.001650	.000150	....	....	
11,000	55,000	.001850	.000200	....	....	
12,000	60,000	.002000	.000150	....	....	
13,000	65,000	.002150	.000150	....	....	
14,000	70,000	.002350	.000200	....	....	
14,400	72,000	.002500	.000150	....	....	
14,800	74,000	.002600	.000100	....	....	
15,000	75,000	.002650	.000050	....	....	Elastic limit.
15,200	76,000	.003000	.000350	....	....	
15,400	77,000	.004500	.001500	....	....	
15,600	78,000	.006750	.002250	....	....	
16,000	80,000	.008750	.002000	....	....	
16,400	82,000	.010350	.001600	....	....	
16,800	84,000	.012000	.001650	....	....	
17,200	86,000	.014000	.002000	....	....	
17,600	88,000	.015850	.001850	....	....	
18,000	90,000	.017850	.002000	....	....	
18,400	92,000	.020150	.002300	....	....	
18,800	94,000	.022350	.002200	....	....	
19,200	96,000	.024750	.002400	....	....	
19,600	98,000	.027250	.002500	....	....	
20,000	100,000	.030000	.002750	....	....	
20,400	102,000	.033000	.003000	....	....	
20,800	104,000	.036500	.003500	....	....	
21,200	106,000	.040850	.004350	....	....	
21,600	108,000	.045850	.005000	....	....	
22,000	110,000	.052850	.007000	....	....	
22,400	112,000	.062500	.009650	....	....	
22,800	114,000	.080500	.0180	....	....	
23,080	115,000	.1350	.0545	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	115,400
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	0.2350
Elongation per inch under strain at elastic limit	do...	.002650
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		1″.20 from the neck
Character of broken surface		fine silky
Elongation of inch sections		″.29*, ″.18

No. 3720.

Marks, $C_{3\text{-}m}T_4$ L_5
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	....	....	
2,500	10,000	.000233	.000133	....	....	
3,750	15,000	.000433	.000200	....	....	
5,000	20,000	.000567	.000134	....	....	
6,250	25,000	.000733	.000166	....	....	
7,500	30,000	.000900	.000167	....	....	
8,750	35,000	.001067	.000167	....	....	
10,000	40,000	.001233	.000166	....	....	
11,250	45,000	.001400	.000167	....	....	
12,500	50,000	.001567	.000167	....	....	
13,750	55,000	.001733	.000166	....	....	
15,000	60,000	.001867	.000134	....	....	
16,250	65,000	.002033	.000166	....	....	
17,500	70,000	.002200	.000167	....	....	
18,000	72,000	.002233	.000033	....	....	
18,500	74,000	.002367	.000134	....	....	
19,000	76,000	.002433	.000066	....	....	
19,250	77,000	.002500	.000067	....	....	Elastic limit.
19,500	78,000	.003900	.001400	....	....	
20,000	80,000	.007333	.003433	....	....	
20,500	82,000	.008900	.001567	....	....	
21,000	84,000	.010667	.001767	....	....	
21,500	86,000	.012667	.002000	....	....	
22,000	88,000	.014500	.001833	....	....	
22,500	90,000	.016233	.001733	....	....	
23,000	92,000	.018233	.002000	....	....	
23,500	94,000	.020567	.002334	....	....	
24,000	96,000	.022667	.002100	....	....	
24,500	98,000	.025000	.002333	....	....	
25,000	100,000	.027333	.002333	....	....	
25,500	102,000	.030567	.003234	....	....	
26,000	104,000	.034167	.003600	....	....	
26,500	106,000	.038000	.003833	....	....	
27,000	108,000	.041933	.003933	....	....	
27,500	110,000	.047000	.005067	....	....	
28,000	112 000	.0533	.0063	....	....	
28,500	114,000	.0633	.0100	....	....	
29,000	116,000	.0867	.0234	....	....	
29,030	116,120	.1267	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	116,120
Elastic limit per square inch of original section ....do...	77,000
Elongation per inch after rupture ....inch..	0.2000
Elongation per inch under strain at elastic limit ....do...	.002500
Reduction in diameter at point of rupture ....do...	.184
Reduction in area after rupture, per centum of original section	54.6
Position of rupture	at middle of stem
Character of broken surface	fine silky
Elongation of inch sections	″.12, ″.38*, ″.10

No. 3721.

Marks, $^{C\,T_4}_{\;L_7}$.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	....	....	
2, 500	10, 000	.000267	.000167	....	....	
3, 750	15, 000	.000433	.000166	....	....	
5, 000	20, 000	.000633	.000200	....	....	
6, 250	25, 000	.000767	.000134	....	....	
7, 500	30, 000	.000900	.000133	....	....	
8, 750	35, 000	.001067	.000167	....	....	
10, 000	40, 000	.001233	.000166	....	....	
11, 250	45, 000	.001433	.000200	....	....	
12, 500	50, 000	.001567	.000134	....	....	
13, 750	55, 000	.001768	.000200	....	....	
15, 000	60, 000	.001933	.000166	....	....	
16, 250	65, 000	.002067	.000134	....	....	
17, 500	70, 000	.002200	.000133	....	....	
18, 000	72, 000	.002333	.000133	....	....	
18, 500	74, 000	.002400	.000067	....	....	
18, 750	75, 000	.002433	.000033	....	....	Elastic limit.
19, 000	76, 000	.003467	.001034	....	....	
19, 250	77, 000	.005867	.002400	....	....	
19, 500	78, 000	.006900	.001033	....	....	
20, 000	80, 000	.008733	.001833	....	....	
20, 500	82, 000	.010667	.001934	....	....	
21, 000	84, 000	.012533	.001866	....	....	
21, 500	86, 000	.014333	.001800	....	....	
22, 000	88, 000	.016067	.001734	....	....	
22, 500	90, 000	.018167	.002100	....	....	
23, 000	92, 000	.020000	.001833	....	....	
23, 500	94, 000	.022267	.002267	....	....	
24, 000	96, 000	.024667	.002400	....	....	
24, 500	98, 000	.027333	.002666	....	....	
25, 000	100, 000	.030000	.002667	....	....	
25, 500	102, 000	.033333	.003333	....	....	
26, 000	104, 000	.036933	.003600	....	....	
26, 500	106, 000	.041000	.004067	....	....	
27, 000	108, 000	.045833	.004833	....	....	
27, 500	110, 000	.052500	.006667	....	....	
28, 000	112, 000	.0633	.0108	....	....	
28, 500	114, 000	.0733	.0100	....	....	
28, 710	114, 840	.1100	.0367	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	114, 840
Elastic limit per square inch of original section	do	75, 000
Elongation per inch after rupture	inch	0. 1967
Elongation per inch under strain at elastic limit	do	.002433
Reduction in diameter at point of rupture	do	.184
Reduction in area after rupture, per centum of original section		54. 6
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		″.11, ″.38+, ″.10

TABULATION OF SPECIMENS TESTED FOR COMPARISON OF WATERTOWN ARSENAL AND MIDVALE TESTING MACHINES, FROM FOUR MIDVALE STEEL BARS.

No. of test.	No. of bar.	Mark on specimen.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Gauged length.	Elongation in gauged length.	Area at fracture.		Contraction of area.	Fracture.	Elongation of inch sections.
									Diameter.	Area.			
			Inch.	*Sq. in.*	*Pounds.*	*Pounds.*	*Inches.*	*Per cent.*	*Inch.*	*Sq. in.*	*Per cent.*		
3706	1	$CT_1 L_1$	.505	.20	40,000	77,300	2	16.5	.39	.1194	40.3	Silky	″.34*, ″.14
3707	1	$CT_1 L_3$	.505	.20	39,000	76,800	2	24.0	.40	.1257	37.1	Silky 85 per cent., granular 15 per cent.	″.31*, ″.17
3708	1	$CT_1 L_5$	.564	.25	35,000	77,680	3	24.0	.45	.1590	36.4	Silky, trace of granulation	″.17, ″.36*, ″.19
3709	1	$CT_1 L_7$	.564	.25	35,000	76,680	3	25.7	.44	.1521	39.2	Silky	″.19, ″.39*, ″.19
3710	2	$CT_2 L_1$	.505	.20	52,000	88,800	2	25.0	.33	.0855	57.2	Fine silky	″.39*, ″.11
3711	2	$CT_2 L_3$	.505	.20	56,000	89,200	2	26.5	.32	.0804	59.8	....do	″.24, ″.29*
3712	2	$CT_2 L_5$	.564	.25	55,000	89,960	3	23.0	.37	.1075	57.0	....do	″.29, ″.30*, ″.10
3713	2	$CT_2 L_7$	.564	.25	54,000	88,920	3	23.0	.36	.1018	59.3	....do	″.41*, ″.17, ″.11
3722	2	$CT_2 L_9$	.564	.25	55,000	91,000	4	18.5	.37	.1075	57.0	....do	″.39*, ″.16, ″.11, ″.08
3723	2	$CT_2 L_{11}$	.564	.25	53,000	89,640	4	17.5	.37	.1075	57.0	....do	″.40*, ″.13, ″.09, ″.08
3714	3	$CT_3 L_1$	.505	.20	65,000	103,200	2	24.5	.33	.0855	57.2	....do	″.15, ″.34
3315	3	$CT_3 L_3$	.505	.20	64,000	103,100	2	24.5	.33	.0855	57.2	....do	″.27*, ″.22
3716	3	$CT_3 L_5$	.564	.25	65,000	102,640	3	20.0	.36	.1018	59.3	....do	″.12, ″.41*, ″.13
3717	3	$CT_3 L_7$	.564	.25	66,000	102,840	3	20.7	.36	.1018	59.3	....do	″.11, ″.36*, ″.15
3724	3	$CT_3 L_9$	.564	.25	63,000	101,640	4	20.3	.36	.1018	59.3	....do	″.11, ″.17, ″.42*, ″.11
3725	3	$CT_3 L_{11}$	.564	.25	64,000	101,440	4	19.5	.36	.1018	59.3	....do.	″.11, ″.18, ″.38*, ″.11
3718	4	$CT_4 L_1$	.505	.20	75,000	116,050	2	22.5	.35	.0962	51.9	....do	″.33*, ″.12
3719	4	$CT_4 L_3$	.505	.20	75,000	115,400	2	23.5	.34	.0908	54.6	....do	″.29*, ″.18
3720	4	$CT_4 L_5$	.564	.25	77,000	116,120	3	20.0	.38	.1134	54.6	....do	″.12, ″.38*, ″.10
3721	4	$CT_4 L_7$	.564	.25	75,000	114,840	3	19.7	.38	.1134	54.6	....do	″.11, ″.38*, ″.10

CHAIN CABLE TESTED FOR UNITED STATES LIGHT-HOUSE INSPECTOR, THIRD DISTRICT.

No. of test.	Marks.	Diameter of end link.	Studded links in chain.	Diameter of iron.	Sectional area of chain.	Tensile strength.		Fracture.
						Total.	Per square inch.	
		Inch.		*Inches.*	*Inches.*	*Pounds.*	*Pounds.*	
2100	"J. B. C. & Co., proved"	2⅛	3	2.00	6.28	222,100	35,370	First link at weld following scarf.
2175	.... do	2.10	3	2.00	6.28	250,100	39,820	First studded link in weld, fibrous.
2459	.... do	2.10	3	1.98	6.16	171,100	27,710	First studded link in weld, 10 per cent. granular, followed the scarf in part, 30 per cent. of which exhibited a smooth surface; balance of fracture fibrous.
2486	"W. L. R. M. Co., Lebanon, Pa".	1.87	3	1.76	4.87	151,100	31,030	Middle link at weld, fibrous,
2487	.... do	1.87	3	1.77	4.92	180,200	36,630	First link at weld, fibrous 85 per cent., granular 15 per cent.
2488	.... do	1.87	3	1.76	4.87	137,900	28,320	Middle link each side of weld, granular 90 per cent., fibrous 10 per cent.
2489	.... do	2.27	3	2.12	7.06	242,500	34,350	Middle link at weld, granular 15 per cent., fibrous, and followed scarf 85 per cent.
2490	"C. & H. Trenton"	2.15	3	1.98	6.16	233,800	37,950	First link at weld, fibrous 60 per cent., granular 40 per cent.
2491	.... do	2.15	3	2.00	6.28	215,900	34,380	Do
2492	.... do	2.13	3	1.98	6.16	232,200	37,690	Side of middle link 1¾" from end of weld, fibrous 85 per cent., granular at circumference 15 per cent.

No. 2487.

DETAILS OF TEST OF CHAIN IN PRECEDING TABLE.

Measurements of elongation taken on main screw of testing machine
Total length (including end links), 37½″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inches.*	
5, 000	0	0.	0.	Initial load.
10, 000	....	.02	....	
15, 000	....	.06	....	
20, 000	....	.09	....	
25, 000	....	.11	....	
30, 000	....	.15	....	
35, 000	....	.17	....	
40, 000	....	.21	.14	
45, 000	....	.25	....	
50, 000	....	.28	....	
55, 000	....	.31	....	
60, 000	....	.37	.27	
65, 000	....	.44	....	
70, 000	....	.52	....	
75, 000	....	.63	....	
80, 000	....	.77	.65	
85, 000	....	.88	....	
90, 000	....	1.00	....	
95, 000	....	1.11	....	
100, 000	....	1.24	1.10	
105, 000	....	1.39	....	
110, 000	....	1.52	....	
115, 000	....	1.68	....	
120, 000	....	1.84	....	
125, 000	....	2.07	....	
130, 000	....	2.22	....	
135, 000	....	2.44	....	
140, 000	....	2.66	....	
145, 000	....	2.86	....	
150, 000	....	3.07	....	
155, 000	....	3.30	....	
160, 000	....	3.53	....	
165, 000	....	3.84	....	
170, 000	....	4.10	....	
175, 000	....	4.40	....	
180, 000	....	4.80	....	
180, 260	36, 630	....	....	Tensile strength.

STEEL WIRE ROPE

FROM

BOSTON NAVY-YARD.

Ropes secured to testing machine by means of circular grips, excepting No. 2151, which was held by pins passing through thimbles turned in at the ends of rope.

1½″ STEEL WIRE ROPE.

Six strands of 18 wires each, with hemp core.
Measurement of wires of one strand.

Diameter.	Sectional area.	Diameter.	Sectional area.
Inch.	*Sq. inch.*	*Inch.*	*Sq. inch.*
.0320	.000804	.0323	.000819
.0322	.000814	.0318	.000794
.0320	.000804	.0319	.000799
.0324	.000824	.0323	.000819
.0324	.000824	.0321	.000809
.0323	.000819	.0318	.000794
.0323	.000819	.0321	.000809
.0324	.000824	.0323	.000819
.0322	.000814	.0317	.000789
	.007346		.007251

Sectional area of rope, .0876 square inch.

No. 2152.

1½″ STEEL WIRE ROPE.

Spliced with common long splice.
Six tucks made in 8 feet.
Tensile strength, 12,040 pounds=137,440 pounds per square inch.
Parted at the end of the splice.

No. 2153.

1½″ STEEL WIRE ROPE.

Spliced with belt splice.
Tensile strength, 13,320 pounds=152,050 pounds per square inch.
Parted 2 strands.

No. 2154.

1½″ STEEL WIRE ROPE.

Sectional area, .0876 square inch.
Tensile strength, 12,680 pounds=144,750 pounds per square inch.
Parted 5 strands at face of grips.

No. 2155.

1½″ STEEL WIRE ROPE.

Sectional area, .0876 square inch.
Tensile strength, 12,400 pounds=141,550 pounds per square inch.
Parted 4 strands at face of grips.

No. 2451.

1½″ Steel Wire Rope.

Sectional area, .0876 square inch.
Tensile strength, 14,050 pounds=160,390 pounds per square inch.
Parted 4 strands 15″ from fastening.

1¾″ Steel Wire Rope.

Six strands of 18 wires each, with hemp core.
Measurement of wires in one strand.

Diameter.	Sectional area.	Diameter.	Sectional area.
Inch.	*Sq. inch.*	*Inch.*	*Sq. inch.*
.0347	.000946	.0353	.000979
.0347	.000946	.0346	.000940
.0351	.000968	.0348	.000951
.0353	.000979	.0348	.000951
.0350	.000962	.0352	.000973
.0346	.000940	.0354	.000984
.0346	.000940	.0349	.000957
.0347	.000946	.0349	.000957
.0346	.000940	.0344	.000929
	.008567		.008621

Sectional area of rope, .1031 square inch.

No. 2156.

1¾″ Steel Wire Rope.

Sectional area, .1031 square inch.
Tensile strength, 15,510 pounds=150,440 pounds per square inch.
Parted 4 strands at face of grips.

No. 2157.

1¾″ Steel Wire Rope.

Sectional area, .1031 square inch.
Tensile strength, 15,200 pounds=147,430 pounds per square inch.
Parted 4 strands at face of grips.

No. 2450.

1¾″ Steel Wire Rope.

Sectional area, .1031 square inch.
Tensile strength, 16,580 pounds=160,810 pounds per square inch.
Parted 4 strands at fastening.

2″ STEEL WIRE ROPE.

Six strands of 18 wires each.
Measurement of wires in one strand.

Diameter.	Sectional area.	Diameter.	Sectional area.
Inch.	*Sq. inch.*	*Inch.*	*Sq. inch.*
.0422	.001399	.0414	.001346
.0426	.001425	.0420	.001385
.0424	.001412	.0419	.001379
.0420	.001385	.0421	.001392
.0421	.001390	.0422	.001399
.0420	.001385	.0423	.001405
.0417	.001366	.0421	.001392
.0426	.001425	.0419	.001379
.0416	.001359	.0416	.001359
	.012546		.012436

Sectional area of rope, .1499 square inch.

No. 2158.

2″ STEEL WIRE ROPE.

Sectional area, .1499 square inch.
Tensile strength, 20,580 pounds=137,290 pounds per square inch.
Parted 5 strands at face of grips.

No. 2159.

2″ STEEL WIRE ROPE.

Sectional area, .1499 square inch.
Tensile strength, 20,900 pounds=139,430 pounds per square inch.
Parted 1 strand at face of grips.

$2\frac{1}{8}$″ STEEL WIRE ROPE.

Six strands of 18 wires each, with hemp core.
Measurement of wires in one strand.

Diameter.	Sectional area.	Diameter.	Sectional arer.
Inch.	*Sq. inch.*	*Inch.*	*Sq. inch.*
.0453	.001612	.0447	.001569
.0453	.001612	.0450	.001590
.0454	.001619	.0479	.001802
.0453	.001612	.0480	.001810
.0456	.001633	.0476	.001780
.0456	.001633	.0450	.001590
.0456	.001633	.0450	.001590
.0448	.001576	.0452	.001605
.0449	.001583	.0450	.001590
	.014513		.014926

Sectional area of rope, .1766 square inch.

No. 2160.

$2\frac{1}{8}$″ STEEL WIRE ROPE.

Sectional area, .1766 square inch.
Tensile strength, 24,350 pounds=137,880 pounds per square inch.
Parted 4 strands at face of grips.

No. 2161.

$2\frac{1}{8}$″ STEEL WIRE ROPE.

Sectional area, .1766 square inch.
Tensile strength, 24,510 pounds=138,790 pounds per square inch.
Parted 2 strands at face of grips.

$2\frac{1}{4}$″ STEEL WIRE ROPE.

Six strands of 18 wires each, with hemp core.
Measurement of wires in one strand.

Diameter.	Sectional area.	Diameter.	Sectional area.
Inch.	*Sq. inch.*	*Inch.*	*Sq. inch.*
.0488	.001870	.0486	.001855
.0487	.001863	.0486	.001855
.0493	.001909	.0486	.001855
.0492	.001901	.0490	.001886
.0489	.001878	.0489	.001878
.0487	.001863	.0490	.001886
.0484	.001840	.0489	.001878
.0488	.001870	.0487	.001863
.0494	.001917	.0482	.001825
	.016911		.016781

Sectional area of rope, .2021 square inch.

No. 2162.

$2\frac{1}{4}$″ STEEL WIRE ROPE.

Sectional area, .2021 square inch.
Tensile strength, 30,080 pounds=148,760 pounds per square inch.
Parted 3 strands at face of grips.

No. 2163.

2¼″ STEEL WIRE ROPE.

Sectional area, .2021 square inch.
Tensile strength, 30,040 pounds=148,570 pounds per square inch.
Parted 4 strands at face of grips.

2½″ STEEL WIRE ROPE.

Six strands of 18 wires each, with hemp core.
Measurement of wires in one strand.

Diameter.	Sectional area.	Diameter.	Sectional area.
Inch.	*Sq. inch.*	*Inch.*	*Sq. inch.*
.0543	.002316	.0546	.002341
.0541	.002299	.0546	.002341
.0544	.002324	.0544	.002324
.0543	.002316	.0547	.002350
.0543	.002316	.0543	.002316
.0544	.002324	.0546	.002341
.0544	.002324	.0543	.002316
.0544	.002324	.0544	.002324
.0540	.002290	.0546	.002341
	.020833		.020994

Sectional area of rope, .2510 square inch.

No. 2164.

2½″ STEEL WIRE ROPE.

Sectional area, .2510 square inch.
Tensile strength, 32,260 pounds=128,530 pounds per square inch.
Parted 1 strand 16″ from the grips.

No. 2165.

2½″ STEEL WIRE ROPE.

Sectional area, .2510 square inch.
Tensile strength, 34,280 pounds=136,570 pounds per square inch.
Parted 1 strand 12″ from the grips.

No. 2449.

2½″ STEEL WIRE ROPE.

Sectional area, .2510 square inch.
Tensile strength, 35,750 pounds=142,430 pounds per square inch.
Parted 2 strands 6″ from fastening.

2¾″ STEEL WIRE ROPE.

Six strands of 18 wires each, with hemp core.
Measurement of wires in one strand.

Diameter.	Sectional area.	Diameter.	Sectional area.
Inch.	*Sq. inch.*	*Inch.*	*Sq. inch.*
.0588	.002715	.0582	.002660
.0583	.002669	.0584	.002679
.0584	.002679	.0576	.002606
.0579	.002633	.0586	.002697
.0580	.002642	.0589	.002725
.0586	.002697	.0586	.002697
.0584	.002679	.0583	.002669
.0583	.002669	.0580	.002642
.0581	.002651	.0583	.002669
	.024034		.024044

Sectional area of rope, .2885 square inch.

No. 2166.

2¾″ STEEL WIRE ROPE.

Sectional area, .2885 square inch.
Tensile strength, 38,150 pounds=132,240 pounds per square inch.
Parted 2 strands at face of grips.

No. 2167.

2¾″ STEEL WIRE ROPE.

Sectional area, .2885 square inch.
Tensile strength, 36,400 pounds=126,170 pounds per square inch.
Parted 1 strand 18″ from the grips.

No. 2174.

2¾″ STEEL WIRE ROPE.

Sectional area, .2885 square inch.
Tensile strength, 39,280 pounds=136,150 pounds per square inch.
Parted 1 strand 2 feet from grips.

No. 2151.

2¾" STEEL WIRE ROPE.

This specimen was wormed, parceled, and served, and had a thimble turned in at each end.

One end was stopped back with five flat seizings of ⅜" iron wires. The throat seizing consists of fifteen turns; the other four have one turn less on each succeeding seizing down to the end.

The other end was stopped back with five riding-turn seizings of ⅜" iron wires. The throat seizing has thirteen turns in first layer and twelve riding turns.

The two ends came close together on the standing part before commencing the test.

Length of specimen, 10 feet.

Sectional area of rope, .2885 square inch.

Elongations measured from center to center of pins through thimbles.

Applied loads.		Elongation.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1,000	....	0.	Initial load.
5,000	....	.30	
10,000	....	.71	
15,000	....	1.13	
20,000	....	1.52	
25,000	....	2.12	
30,000	....	2.93	
35,000	....	3.87	
40,000	138,640	5.23	Tensile strength.

Sustained the maximum load 12 minutes, then parted 4 strands of the rope near the middle of the length.

Opening between ends on standing part after fracture of the rope, 6¾".

3" STEEL WIRE ROPE.

Six strands of 18 wires each, with hemp core.

Measurement of wires in one strand.

Diameter.	Sectional area.	Diameter.	Sectional area.
Inch.	*Sq. inch.*	*Inch.*	*Sq. inch.*
.0588	.002715	.0594	.002771
.0596	.002790	.0594	.002771
.0602	.002846	.0601	.002837
.0600	.002827	.0597	.002799
.0596	.002790	.0596	.002790
.0600	.002827	.0592	.002753
.0604	.002865	.0595	.002781
.0602	.002846	.0598	.002809
.0593	.002762	.0599	.002818
	.025268		.025129

Sectional area of rope, .3024 square inch.

No. 2448.

2¾″ STEEL WIRE ROPE.

Sectional area, .2885 square inch.
Tensile strength, 39,820 pounds=138,020 pounds per square inch.
Parted 1 strand 15″ from fastening.

No. 2168.

3″ STEEL WIRE ROPE.

Sectional area, .3024 square inch.
Tensile strength, 46,820 pounds=154,830 pounds per square inch.
Parted 3 strands at face of the grips.

No. 2169.

3″ STEEL WIRE ROPE.

Sectional area, .3024 square inch.
Tensile strength 46,710 pounds=154,460 pounds per square inch.
Parted 1 strand at the middle of the length.

No. 2447.

3″ STEEL WIRE ROPE.

Sectional area, .3024 square inch.
Tensile strength, 45,580 pounds=150,730 pounds per square inch.
Parted 1 strand 5″ from fastening.

3½″ STEEL WIRE ROPE.

Six strands of 18 wires each, with hemp core.
Measurement of wires in one strand.

Diameter.	Sectional area.	Diameter.	Sectional area.
Inch.	*Sq. inch.*	*Inch.*	*Sq. inch.*
.0725	.004128	.0719	.004060
.0721	.004083	.0718	.004049
.0719	.004060	.0715	.004015
.0720	.004072	.0719	.004060
.0714	.004004	.0721	.004083
.0722	.004094	.0720	.004072
.0717	.004038	.0714	.004004
.0719	.004060	.0713	.003993
.0721	.004083	.0717	.004038
	.036622		.036374

Sectional area of rope, .4380 square inch.

No. 2170.

3½″ STEEL WIRE ROPE.

Sectional area, .4380 square inch.
Tensile strength, 66,100 pounds=150,910 pounds per square inch.

Parted 3 strands and 8 wires of fourth strand at the middle of the length.

No. 2171.

3½″ Steel Wire Rope.

Sectional area, .4380 square inch.
Tensile strength, 65,740 pounds=150,090 pounds per square inch.
Parted 2 strands at the middle of the rope.

No. 2446.

3½″ Steel Wire Rope.

Sectional area, .4380 square inch.
Tensile strength, 64,500 pounds = 147,260 pounds per square inch.
Parted 2 strands 15″ from end of fastening.

4½″ Steel Wire Rope.

Six strands of 18 wires each, with hemp core.
Measurement of wires in one strand.

Diameter.	Sectional area.	Diameter.	Sectional area.
Inch.	*Sq. inch.*	*Inch.*	*Sq. inch.*
.0997	.007807	.0979	.007528
.0975	.007466	.0986	.007636
.0980	.007543	.0978	.007512
.0982	.007574	,0978	.007512
.0980	.007543	.0982	.007574
.0990	.007698	.0977	.007497
.0986	.007636	.0964	.007299
.0974	.007451	.0983	.007589
.0975	.007466	.0978	.007512
	.068184		.067659

Sectional area of rope, .8151 square inch.

No. 2172.

4½″ Steel Wire Rope.

Sectional area, .8151 square inch.
Tensile strength, 138,100 pounds = 169,430 pounds per square inch.
Parted 3 strands 10″ from face of grips.

No. 2173.

4½″ Steel Wire Rope.

Sectional area, .8151 square inch.
Tensile strength, 139,150 pounds = 170,720 pounds per square inch.
Parted 1 strand 7″ from the grips.

TABULATION OF TESTS OF STEEL WIRE ROPE.

No. of test.	Description of rope.					Sectional area of wire.	Tensile strength.		Fractured.	Remarks.
	Circumference.	No. of strands.	Wires per strand.	Mean diameter of wires.	Core.		Total.	Per square inch.		
	Inches.			*Inch.*		*Sq. inch.*	*Pounds.*	*Pounds.*		
2152	1½	6	18	.0321	Hemp ..	.0876	12, 040	137, 440	At end of splice	Contained common long splice.
2153							13, 320	152, 050	2 strands	Contained belt splice.
2154							12, 680	144, 750	5 strands at face of grips	
2155							12, 400	141, 550	4 strands at face of grips	
2451							14, 050	160, 390	4 strands 15″ from fastening	
2156	1¾	6	18	.0349	Hemp ..	.1031	15, 510	150, 440	4 strands at face of grips	
2157							15, 200	147, 430	....do	
2450							16, 580	160, 810	4 strands at fastening	
2158	2	6	18	.0420	Hemp ..	.1499	20, 580	137, 290	5 strands at face of grips	
2159							20, 900	139, 430	1 strand at face of grips	
2160	2⅛	6	18	.0456	Hemp ..	.1766	24, 350	137, 880	4 strands at face of grips	
2161							24, 510	138, 790	2 strands at face of grips	
2162	2¼	6	18	.0488	Hemp ..	.2021	30, 080	148, 760	3 strands at face of grips	
2163							30, 040	148, 570	4 strands at face of grips	
2164	2½	6	18	.0544	Hemp ..	.2510	32, 260	128, 530	1 strand 16″ from grips	
2165							34, 280	136, 570	1 strand 12″ from grips	
2449							35, 750	142, 430	2 strands 6″ from fastening	
2166	2¾	6	18	.0583	Hemp ..	.2885	38, 150	132, 240	2 strands at face of grips	
2167							36, 400	126, 170	1 strand 18″ from grips	
2174							39, 280	136, 150	1 strand 24″ from grips	
2151							40, 000	138, 640	4 strands at middle	Wormed, parceled, and served, and thimble turned in at each end.
2448							39, 820	138, 020	1 strand 15″ from fastening	
2168	3	6	18	.0598	Hemp ..	.3024	46, 820	154, 830	3 strands at face of grips	
2169							46, 710	154, 460	1 strand at middle	
2447							45, 580	150, 730	1 strand 5″ from fastening	
2170	3½	6	18	.0718	Hemp ..	.4380	66, 100	150, 910	3 strands and part of 4th at middle	
2171							65, 740	150, 090	2 strands at middle	
2446							64, 500	147, 260	2 strands 15″ from fastening	
2172	4½	6	18	.0980	Hemp ..	.8151	138, 100	169, 430	3 strands 10″ from face of grips	
2173							139, 150	170, 720	1 strand 7″ from face of grips	

TESTS OF INDIVIDUAL WIRES TAKEN FROM FOREGOING TESTED WIRE ROPE.

No. of test.	Size of rope taken from.	Condition.	Diameter of wire.	Sectional area.	Tensile strength.	
					Total.	Per square inch.
	Inches.		*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*
2503	1½	....	.0324	.00082	130	158,540
2504	1½	Annealed ...	.0328	.00084	78	92,860
2505	1½	....	.0321	.00081	139	171,600
2506	1½	Annealed ...	.0321	.00081	84	103,700
2507	1¾	....	.0349	.00096	174	181,250
2508	1¾	Annealed ...	.0349	.00096	98	102,080
2509	1¾	....	.0348	.00095	172	181,050
2510	1¾	Annealed ...	.0352	.00097	94	96,910
2511	2	....	.0430	.00145	226	155,860
2512	2	Annealed ...	.0426	.00143	120	83,920
2513	2	....	.0416	.00136	248	182,350
2514	2	Annealed ...	.0416	.00136	143	105,150
2515	2⅛	....	.0450	.00159	330	207,550
2516	2⅛	Annealed ...	.0450	.00159	180	113,210
2517	2⅛	Annealed ...	.0476	.00178	124	69,660
2518	2¼	....	.0490	.00189	312	165,080
2519	2¼	Annealed ..	.0490	.00189	195	103,170
2520	2¼	....	.0490	.00189	358	189,420
2521	2¼	Annealed ...	.0490	.00189	195	103,170
2522	2½	....	.0546	.00234	502	214,530
2523	2½	Annealed ...	.0546	.00234	264	112,820
2524	2½	....	.0543	.00232	355	153,020
2525	2½	Annealed ...	.0543	.00232	217	93,530
2526	2¾	....	.0593	.00276	452	163,770
2527	2¾	Annealed ...	.0593	.00276	264	95,650
2528	2¾	....	.0588	.00272	438	161,030
2529	2¾	Annealed ...	.0588	.00272	240	88,240
2530	3	....	.0600	.00283	478	168,900
2531	3	Annealed ...	.0600	.00283	286	101,060
2532	3	....	.0598	.00281	496	176,510
2533	3	Annealed ...	.0598	.00281	297	105,690
2534	3½	....	.0725	.00413	594	143,830
2535	3½	Annealed ...	.0725	.00413	422	102,180
2536	3½	....	.0714	.00400	720	180,000
2537	3½	Annealed ...	.0714	.00400	381	95,250
2538	4½	....	.0980	.00754	1,390	184,350
2539	4½	Annealed ...	.0980	.00754	747	99,070
2540	4½	Annealed ...	.0980	.00754	735	97,480

TENSILE TESTS OF MANILLA ROPE FROM BOSTON NAVY-YARD.

No. 2747.

No mark.
3 inch manilla rope.
3 strands of 20 threads and hemp core each.
Tensile strength, 7,100 pounds.
Parted 1 strand at the pin.

No. 2748.

Marked, "From inspector thirteenth light-house district."
3⅛ inch manilla rope.
3 strands of 19 threads each.
Tensile strength 7,860 pounds.
Parted at hitch.

SHOT LINES.

HEMP, MANILLA, COTTON, AND LINEN LINES TESTED FOR THE U. S. LIFE-SAVING SERVICE.

SHOT LINES.

HEMP, MANILA, COTTON, AND LINEN LINES TESTED FOR THE U. S. LIFE-SAVING SERVICE.

Tests were made of hemp, manila, linen, and cotton, braided and twisted lines.

The sizes ranged from ″.13 to ″.28 diameter.

Three tests were made of each sample to establish their relative strength and elongation, using samples 6 feet long between reference marks.

Other tests were made to determine the elongations and permanent sets under different loads, the strength and elasticity of wet lines, also of lines which had been wet and subsequently dried, and tests of strands and threads composing the lines; a number of tests under different stresses, also under prolonged stresses.

In the tabulation of results are given a description of lines, and weights per 100 fathoms.

A number of pieces of line were unlayed and the lengths of strands and threads measured, which in comparison with the original lengths of the pieces (12″) as cut from the lines, indicate the lengths of threads required to make the several kinds of line thus examined. In this connection it will be noted that the elementary parts of the same piece of line in some instances are of varying lengths, which fact necessarily tends toward causing unequal distribution of stresses on those several parts.

The lines were secured for testing by taking several turns around grooved pins 4″ diameter, which were held against turning in the jaws of the testing-machine. The ends of the lines were then made fast to cleats.

The employment of these grooved pins was regarded as satisfactory, and this manner of fastening was thought to give substantially the full strength of lines of these diameters unimpaired by the influence of the fastenings.

In the first series of tests of three trials of each kind of line, the loads were slowly but with few exceptions continuously applied and increased up to the limit of rupture, observations being made on the elongation of the line at different loads, the position of the fracture noted with reference to its distance from the pins where fastened, or from the middle of the length.

A number of the lines were measured after fracture, when the break occurred outside the reference marks.

The permanent sets thus obtained do not indicate the ability of the lines to recover from a gradually released stress; there is considerable recoil and upsetting which occurs when a line suddenly parts, and the fractured ends are shortened by these means beyond their normal amount of contraction. This feature is illustrated by a large number of instances in the second series of tests wherein the sets were determined after the application and release of loads below the maximum.

A considerable portion of the elongation displayed by a new rope, it is seen, results in permanent set, the different kinds of lines differing, however, materially in this respect.

The elongation of a rope appears to be largely due to the manner of laying or braiding and its general looseness of structure, and to a less extent due the actual elongation of the fibers themselves.

It may be conceived that some of the apparent elongation is due to the slipping of the fibers along each other until arrested by friction; direct evidence upon this point is not at hand.

In the third series the lines were wet and tested in that condition. Observations were made on the amount of contraction in length, due to wetting.

The tests show generally an increase in strength of the wet rope over the dry rope, and an increased elongation, even after deducting the amount of contraction due to wetting.

The flexibility of the wet linen twisted lines was quite as great as when dry. The twisted hemp and manilla were much less flexible when wet, excepting the sample marked ¼″ Russia hemp, twisted, which retained about the same flexibility, wet or dry.

The twisted cotton lines and the different braided lines were stiff when wet.

The series of wet and dried samples, Table No. 4, showed, with exception of two twisted linen lines, a recovery in the contraction which took place while drying.

The flexibility of the several lines was increased by this process.

Although a permanent contraction generally resulted, it was of a very unstable character, and gave way under a few pounds tensile stress. These lines developed higher strength than the first series of samples.

A conjectural explanation of this last feature may be that the fibers, during wetting and drying, are brought into a more uniform state of tension than they were left by rope machines; also flexibility of fibers may conduce towards strength.

The time employed in making the test has an influence on the elongation developed, and upon the tensile strength. From 10 to 15 minutes were consumed in making these tests, unless the time is stated in the details.

While it requires time for the full effect of a load to be reached, time is also important in allowing full recovery in length after the release of load. The cotton line was notably sluggish in recovering in length.

The tests, which were made outside of the testing machine, of lines loaded by means of suspended weights, show the failure of lines at greatly reduced loads below the average, or even minimum, tensile strength as determined by immediate fracture.

Concerning the contractile force developed by wetting a taut rope, a comparatively few observations indicate that the contractile force has a maximum limit which does not, under some conditions, reach a very high limit in terms of the breaking strength of the rope; at least, contraction seems to progress most favorably when the rope is slack, or not carrying a large load. Of course water penetrates slowly a taut line, but, independent of that fact, a heavy load seems to nearly, or quite, arrest contraction.

If the rope is wet while sustaining a high load, the wetting at times even seems to facilitate additional stretching.

Upon releasing from a high load a rope which has been wet while under stress, contraction then takes place, and re-application of the load does not restore the length, but it remains shorter under the re-applied load than it was before the load was released. All the phenomena of shrinking and swelling, and the variations in behavior under different hygrometric conditions, have not been experimentally determined.

This much seems to be the case, however, that while ropes, as a whole, contract in length when wet, being free from, or under, a light load at the time, the individual fibers have a tendency to elongate.

Observations made on manila fibers show a decided elongation when wet, and then contraction when dried.

Hemp and linen fibers did not show so marked results, and it was somewhat uncertain whether they were materially affected in their length.

The cotton fibres are of so short staple that observations were not undertaken with them at this time.

Generally speaking, the contraction of a wet rope is due to the manner in which it is laid.

The tests of the individual strands and threads of the several kinds of lines enable a fair idea to be obtained of the relative efficiency between ropes differently laid and between braided and twisted lines, where strength alone is considered.

Whereas the strands and threads of the linen lines were of uniform size and fairly uniform strength from the same piece of rope, there was some variation in the hemp and manila strands and threads, and in unlaying the latter ropes so much of the twist was lost, the strand and threads being allowed to assume a state of rest, that untrustworthy results were obtained. The same is true of the cotton threads.

Single strands were tested in lengths of 3 feet between the pins, to which they were fastened, and single threads were tested in free lengths of 6 to 8 inches.

GENERAL TABULATION OF SHOT-LINE TESTS.

TABLE No. 1.—FIRST SERIES.

LINES FURNISHED BY SEWALL & DAY CORDAGE COMPANY.

No. of test.	Marks.	Description.				Length.		Weight.				Tensile strength.		Elongation in 6 feet.		Remarks.
		Diameter.	Strands.	Threads per strand.	Lay, one turn in.			Total.		Per 100 fathoms.		Total.	Mean.			
		Inch.			*Inch.*	*Ft.*	*In.*	*Lbs.*	*Oz.*	*Lbs.*	*Oz.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	
2176	Pure manila, size $\frac{15}{64}$	.26	3	2	.75	106	3½	2	1½	11	13.1	778	800	6.65	9.2	No core.
2177												792		6.75	9.4	
2178												829		7.40	10.3	
2179	Pure manila cable, size $\frac{16}{64}$	.28	4	3	1.00	106	10	2	5½	13	2.6	668	688	9.25	12.8	Core of 1 thread.
2180												669		9.00	12.5	
2181												727		9.10	12.6	
2182	Pure manila, size $\frac{12}{64}$	.21	3	2	.67	104	11½	1	7½	8	6.3	615	647	4.20	5.8	No core.
2183												630		4.20	5.8	
2184												697		4.12	5.7	
2185	Hemp cable, $\frac{16}{64}$	.28	4	3	.85	154	10	4	7	17	3.1	894	865	7.00	9.7	Core of 1 thread.
2186												800		6.30	8.8	
2187												900		7.00	9.7	
2188	Italian line, $\frac{15}{64}$, 8 thread (hemp)	.27	4	2	.80	153	1	4	5½	17	0.4	796	861	5.60	7.8	Core of 1 thread.
2189												946		6.40	8.9	
2190												840		6.40	8.9	
2191	Hemp, size $\frac{3}{16}$	.15	3	2	.50	148	2	1	1½	4	6.9	325	316	4.80	6.7	No core.
2192												322		4.40	6.1	
2193												300		4.40	6.1	

LINES FURNISHED BY M. F. WHITON & CO.

No. of test.	Marks.	Diameter.	Strands.	Threads per strand.	Lay, one turn in.	Length, Ft.	Length, In.	Weight, Total, Lbs.	Weight, Total, Oz.	Per 100 fathoms, Lbs.	Per 100 fathoms, Oz.	Tensile strength, Total.	Tensile strength, Mean.	Elongation, Inches.	Elongation, Per ct.	Remarks.
2194	Best Russia hemp, $\frac{7}{32}$	.18	3	4	.60	111	5	1	6	7	6.4	665	542	6.60	9.2	No core.
2195												460		6.00	8.3	
2196												500		6.30	8.8	
2197	Best Russia hemp, $\frac{4}{32}$	.13	3	2	.56	125	0	0	11.9	3	9.1	348	291	5.50	7.6	No core.
2198												230		4.60	6.4	
2199												295		4.55	6.3	
2200	Barbour's best gilling thread, $\frac{7}{32}$	.20	3	14	.81	123	8	1	4½	6	3.5	498	531	6.50	9.0	No core.
2201												510		7.30	10.1	
2202												585		7.00	9.7	

2203	Barbour's best gilling thread, $\frac{4}{32}$...	.13	3	6	.50	125	0	0	8.7	2	9.8	260	264	7.10	9.9	No core.
2204												283		7.00	9.7	
2205												250		6.40	8.9	
2206	Barbour's linen shoe thread, $\frac{7}{32}$, 6-thread.	.18	3	5 cords, 6 threads each.	.83	124	5	1	0.2	4	12.1	465	475	6.60	9.2	No core.
2207												468		6.60	9.2	
2208												492		6.00	8.3	
2209	Barbour's linen shoe thread, $\frac{4}{32}$, 6-thread.	.13	3	3 cords, 6 threads each.	.60	123	6	0	11.8	3	9.3	278	277	5.90	8.2	No core.
2210												260		6.25	8.7	
2211												292		6.30	8.8	
2212	Barbour's linen shoe thread, 9-strand.	.21	3	6 cords, 9 threads each.	.67	113	6	1	6.3	7	5.9	448	480	8.00	11.1	No core.
2213												496		7.40	10.3	
2214												495		8.25	11.5	
2215	Barbour's linen shoe thread, 9-strand.	.15	3	3 cords, 9 threads each.	.52	111	10	0	10.2	3	6.7	292	293	7.20	10.0	No core.
2216												298		7.40	10.3	
2217												289		7.50	10.4	
2218	Barbour's linen shoe thread, 11-thread, $\frac{7}{32}$.	.19	3	4 cords, 11 threads each.	.75	123	4	1	1.2	5	3.7	510	523	6.60	9.2	
2219												560		7.00	9.7	
2220												500		6.40	8.9	
2221	Barbour's linen shoe thread, 11-ply, $\frac{4}{32}$.	.13	3	2 cords, 11 threads each.	.50	124	10	0	8.6	2	9.3	247	252	6.30	8.8	
2222												252		6.40	8.9	
2233												258		6.10	8.5	
2224	"Coy" best linen gilling, No. 16, 3-ply, $\frac{7}{32}$.	.19	3	14	.84	125	1	1	2.2	5	7.3	380	430	6.40	8.9	
2225												466		7.25	10.1	
2226												444		7.00	9.7	
2227	"Coy" best linen gilling, No. 16, 3-ply, $\frac{4}{32}$.	.12	3	6	.75	124	8	0	7.7	2	5.1	198	201	6.00	8.3	
2228												295		6.30	8.8	
2229												200		6.80	9.4	
2230	"Coy" best linen gilling, No. 25, 2-ply, $\frac{7}{32}$.	.18	3	30	.70	124	5	1	1.2	5	2.9	415	419	6.00	8.3	
2231												398		6.10	8.5	
2232												445		5.70	7.9	
2233	"Coy" best linen gilling, No. 25, 2-ply, $\frac{4}{32}$.	.12	3	14	.70	123	11	0	8	2	6.7	238	221	6.00	8.3	
2234												225		6.20	8.6	
2235												200		5.60	7.8	
2325	"Coy" best linen gilling, No. 30, 2-ply, $\frac{7}{32}$.	.19	3	35	.67	124	2	1	2	5	7	431	458	7.00	9.7	
2326												448		6.25	8.7	
2327												494		6.25	8.7	
2328	"Coy" best linen gilling, No. 30, 2-ply, $\frac{4}{32}$.	.12	3	16	.55	124	0	0	7.9	2	6.2	224	231	6.00	8.3	
2329												233		6.00	8.3	
2330												236		6.00	8.3	
2331	"Coy" best linen gilling, No. 30, 3-ply, $\frac{7}{32}$.	.19	3	24	.75	124	2	1	2.1	5	7.5	395	454	7.00	9.7	
2332												472		6.70	9.3	
2333												496		6.00	8.3	
2334	"Coy" best linen gilling, No. 30, 3-ply, $\frac{4}{32}$.	.12	3	11	.62	123	8	0	8.2	2	7.8	246	251	6.20	8.6	
2335												262		5.75	8.0	
2336												246		6.00	8.3	
2337	"Coy" best linen gilling, No. 40, 2-ply, $\frac{7}{32}$.	.17	3	45	.70	124	10	1	0.5	4	15.3	335	387	6.80	9.4	
2338												405		6.15	8.5	
2339												420		5.85	8.1	
2340	"Coy" best linen gilling, No. 40, 2-ply, $\frac{4}{32}$.	.11	3	20	.52	124	0	0	7.2	2	2.8	228	210	6.40	8.9	
2341												212		5.50	7.6	
2342												190		6.00	8.3	

GENERAL TABULATION OF SHOT-LINE TESTS—Continued.

LINES FURNISHED BY M. F. WHITON & CO.—Continued.

No. of test.	Marks.	Description.				Length.		Weight.				Tensile strength.		Elongation in 6 feet.		Remarks.
		Diameter.	Strands.	Threads per strand.	Lay, one turn in.			Total.		Per 100 fathoms.		Total.	Mean.			
		Inch.			*Inch.*	*Ft.*	*In.*	*Lbs.*	*Oz.*	*Lbs.*	*Oz.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	
2343	Smith & Dove, sail twine, $\frac{7}{32}$	.20	3	8 cords, 2 threads each.	.87	125	0	1	5	6	4.8	655	663	5.00	6.9	
2344												660		5.50	7.6	
2345												674		4.75	6.6	
2346	Smith & Dove, sail twine, $\frac{4}{32}$	.16	3	5 cords, 2 threads each.	.62	125	6	0	13.1	3	14.6	437	440	5.50	7.6	
2347												420		5.10	7.1	
2348												464		5.10	7.1	
2349	Marshall's linen thread, $\frac{7}{32}$	.19	3	18	.62	124	5	1	1.1	5	2.5	420	458	7.00	9.7	
2350												472		7.30	10.1	
2351												482		7.00	9.7	
2352	Marshall's linen thread, $\frac{4}{32}$	.13	3	10	.56	124	0	0	9.1	3	8	282	288	6.35	8.8	
2353												294		6.00	8.3	
2354												289		6.30	8.8	
2355	Best Italian hemp, $\frac{7}{32}$	.19	3	4	.80	117	6	1	6.1	7	0.9	620	563	4.60	6.4	
2356												544		4.95	6.9	
2357												525		4.60	6.4	
2358	Best Italian hemp, $\frac{4}{32}$	.14	3	2	.50	122	7	0	10.6	3	3.9	295	271	5.25	7.3	
2359												268		4.85	6.7	
2360												250		5.00	6.9	
2361	No. 3=No. 5, W. E. H. & Son, cotton	.20	3	23	.58	100	5	1	2.2	6	12.7	347	365	13.00	18.1	
2362												350		14.80	20.6	
2363												397		13.80	19.2	
2364	$\frac{3}{16}$ or No. 6, W. E. H. & Son, cotton	.22	3	25	.56	107	3	1	5.7	7	9.4	432	438	14.00	19.4	
2365												435		14.00	19.4	
2366												448		13.75	19.1	
2367	$\frac{1}{4}$ or No. 8, W. E. H. & Son, cotton	.26	3	45	.62	108	5	2	1.2	11	7.7	700	695	18.25	25.3	
2368												676		16.50	22.9	
2369												710		17.80	24.7	
2255	No. 2 4½, W. E. H. & Son, cotton	.18	3	17	.50	102	0	0	14.2	5	3.5	262	265	17.25	23.9	Tested at higher speed.
2256												292		19.00	26.4	
2257												242		16.20	22.5	

LINES FURNISHED BY SILVER LAKE COMPANY.

No. of test.	Marks.	Diameter.	Strands.	Threads per strand.	Lay, one turn in.	Ft.	In.	Total Lbs.	Total Oz.	Per 100 fathoms Lbs.	Per 100 fathoms Oz.	Tensile Total.	Tensile Mean.	Inches.	Per ct.	Remarks.
2236	No. 4 shot line, "Coy" best linen gilling, No. 25, 2-ply.	.14	9	6	Braided.	100	0	0	11.8	4	6.8	190	194	8.40	11.7	
2237												200		8.50	11.8	
2238												192		8.60	11.9	

2239	No. 4 shot line, Smith & Dove, No. 16, 5-ply linen shoe thread.	.14	9	5	Braided.	101	1	0	10.5	3	14.3	153	144	11.50	16.0	Core of 14 finer threads.
2240												143		11.40	15.8	
2241												136		12.60	17.5	
2242	No. 4 shot line, Barbour's 9-cord linen shoe thread, 95 cents.	.14	9	9	Braided.	102	1	0	11.2	4	1.9	200	198	8.65	12.0	
2243												197		8.25	11.5	
2244												196		8.60	11.9	
2245	No. 4 shot line, Barbour's 8-cord linen shoe thread, 95 cents per pound. Same stock as Barbour's 11-cord at 95 cents per pound.	.14	9	9	Braided.	101	4	0	11.2	4	2.3	199	192	9.10	12.6	
2246												181		8.80	12.2	
2247												197		8.00	11.1	
2248	No. 4 shot line, Barbour's 6-cord linen shoe thread, 57 cents per pound.	.14	9	6	Braided.	101	2	0	10.7	3	15.5	169	171	9.25	12.8	
2249												172		10.60	13.9	
2250												172		9.75	13.5	
2251	No. 4 shot line, No. 12, 3-ply cotton yarn.	.14	9	4	Braided.	100	7	0	10.2	3	12.8	150	135	17.50	24.3	Tested at higher speed.
2252												127		17.50	24.3	
2253												140		17.50	24.3	
2254												122		17.50	24.3	
2259	No. 4 shot line, Barbour's best gilling thread.	.14	9	3	Braided.	101	2	0	13.2	4	14.3	276	278	6.35	8.8	
2260												282		6.20	8.6	
2261												276		7.20	10.0	
2262	No. 4 shot line, "Coy" best linen gilling, No. 30, 2-ply.	.14	9	9	Braided.	101	11	0	13.8	5	1.3	300	289	7.40	10.3	
2263												298		7.40	10.3	
2264												268		6.25	8.7	
2265	No. 4 shot line, "Coy" best linen gilling, No. 16, 3-ply.	.14	9	3	Braided.	101	3	0	12.	4	7.1	236	235	7.20	10.0	
2266												237		7.15	9.9	
2267												232		7.00	9.7	
2265*a*	No. 4 shot line, Smith & Dove, best linen sail twine.	.13	9	3	Braided.	101	5	0	9.6	3	8.8	150	153	10.25	14.2	Core of 1 thread.
2266*a*												156		10.00	13.9	
2267*a*												152		10.00	13.9	
2268	No. 4 shot line, Italian hemp	.14	9	3	Braided.	101	4	0	11.8	4	5.9	184	202	6.00	8.3	
2269												216		6.25	8.7	
2270												205		5.40	7.5	
2271	No. 4 shot line, "Coy" best linen gilling, No. 30, 2-ply.	.14	9	6	Braided.	100	11	0	13.5	5	0.3	281	274	6.60	9.2	
2272												281		8.00	11.1	
2273												260		8.20	11.4	
2274	No. 4 shot line, "Coy" best linen gilling, No. 40, 2-ply.	.14	9	10	Braided.	101	7	0	11.6	4	4.5	244	247	9.60	13.3	
2275												236		9.20	12.8	
2276												260		9.20	12.8	
2277	No. 4 shot line, No. 25, 3-ply Marshall's linen thread.	.14	9	4	Braided.	101	0	0	12.	4	7.3	233	237	8.00	11.1	
2278												230		8.40	11.7	
2279												249		8.00	11.7	
2280	No. 7 shot line, "Coy" best linen gilling, No. 16, 3-ply.	.23	12	6	Braided.	101	8	2	3.8	13	3.3	473	467	9.50	13.2	Core of fine threads.
2281												461		9.50	13.2	
2282												466		10.00	13.9	
2283	No. 7 shot line, "Coy" best linen gilling, No. 25, 2-ply.	.24	12	14	Braided.	100	8	2	6.	14	2.5	514	510	9.00	12.5	
2284												505		8.40	11.7	
2285												512		8.25	11.4	
2286	No. 7 shot line, "Coy" best linen gilling, No. 30, 2-ply.	.24	12	16	Braided.	101	7	2	4.8	13	9.4	482	461	10.20	14.1	Core of fine threads.
2287												405		9.00	12.5	
2288												497		9.75	13.5	

GENERAL TABULATION OF SHOT-LINE TESTS—Continued.

LINES FURNISHED BY SILVER LAKE COMPANY—Continued.

No. of test.	Marks.	Description.				Length.		Weight.				Tensile strength.		Elongation in 6 feet.		Remarks.
		Diameter.	Strands.	Threads per strand.	Lay, one turn in.			Total.		Per 100 fathoms.		Total.	Mean.			
		Inch.			*Inch.*	*Ft.*	*In.*	*Lbs.*	*Oz.*	*Lbs.*	*Oz.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	
22·9	No. 7 shot line, "Coy" best linen gilling, No. 30, 3-ply.	.23	12	10	Braided.	100	8	2	2.5	12	13.6	450	438	10.00	13.9	Core of fine threads.
2290												450		9.25	12.8	
2291												415		9.00	12.5	
2292	No. 7 shot line, "Coy" best linen gilling, No. 40, 2-ply.	.24	12	21	Braided.	101	3	2	4.2	13	6.5	454	473	12.50	17.4	Core of fine threads.
2293												465		11.40	15.8	
2294												500		12.00	16.7	
2295	No. 7 shot line, Barbour's 6-cord linen.	.25	12	3 cords, 6 threads each.	Braided.	102	0	2	8.7	14	15.4	492	516	6.40	8.9	
2296												500		6.90	9.6	
2297												555		7.10	9.8	
2298	No. 7 shot line, Barbour's 9-cord linen shoe thread, 95 cents.	.23	12	2 cords, 9 threads each.	Braided.	102	7	2	2.2	12	8.0	493	483	11.00	15.3	Core of fine threads.
2299												474		11.50	15.9	
2300												482		10.50	14.6	
2301	No. 7 shot line, Barbour's 11-cord linen shoe thread, 95 cents per lb.	.24	12	2 cords, 11 threads each.	Braided.	101	10	2	5.2	13	11.2	520	504	8.20	11.4	
2302												500		7.30	10.1	
2303												492		7.20	10.0	
2304	No. 7 shot line, Barbour's best gilling thread.	.24	12	6	Braided.	101	10	2	7	14	5.8	478	505	9.00	12.5	
2305												510		9.50	13.2	
2306												527		8.60	11.9	
2307	No. 7 shot line, Smith & Dove, No. 16, 5-ply linen shoe thread.	.24	12	3 cords, 5 threads each.	Braided.	100	0	2	4.2	13	9.2	534	505	10.90	15.1	Core of 11 fine threads.
2308												489		9.00	12.5	
2309												492		9.00	12.5	
2310	No. 7 shot line, Smith & Dove's best linen sail twine.	.23	12	7	Braided.	101	5	2	2.1	12	9.7	378	381	13.20	18.3	Core of 13 threads.
2311												396		13.40	18.6	
2312												370		13.40	18.6	
2313	No. 7 shot line, No. 25, 3-ply Marshall's linen thread.	.23	12	8	Braided.	101	3	2	3.8	13	4.1	478	475	8.40	11.7	Core of 11 finer threads.
2314												471		9.30	12.9	
2315												476		8.75	12.2	
2316	No. 7 shot line, Italian hemp.......	.23	12	6	Braided.	101	1	2	1.2	12	5.1	407	499	9.50	13.2	
2317												478		9.30	12.9	
2318												522		9.65	13.4	
2319	No. 7 shot line, No. 12, 3-ply cotton yarn.	.23	12	10	Braided.	101	8	2	0.1	11	13.4	374	381	17.45	24.2	
2320												374		16.50	22.9	
2321												394		17.00	23.6	
2322	½-inch Russia hemp................	.25	4	2	.75	102	6	2	10.2	15	7	892	836	8.00	11.1	Core of 1 thread.
2323												800		7.30	10.1	
2324												815		7.10	9.9	

SHOT LINES.

DETAILS OF TESTS OF TWISTED LINES.

FIRST SERIES.

Samples 6 feet long between fastenings; ends fastened by taking several turns around pins secured in the jaws of the testing machine.

Figures in heavy faced type show the elongation at the time of reaching the maximum load.

PURE MANILLA, SIZE, $\frac{12}{64}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2182.		No. 2183.		No. 2184.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inch.*	*Inches.*	*Inch.*	*Inches.*	*Inch.*
100	1.25	....	1.40	....	1.00	....
200	2.00	.75	2.10	.70	1.75	.75
300	2.60	.60	2.60	.50	2.35	.60
400	3.00	.40	3.10	.50	2.90	.55
500	3.55	.55	3.50	.40	3.40	.50
600	4.00	.45	4.00	.50	3.80	.40
615	**4.20**	.20	....	....	....	....
630	....	....	**4.20**	.20	....	....
697	....	....	....	....	**4.12**	.32

Mean tensile strength, 647 pounds.
No. 2182 parted 15″ from pin.
No. 2183 parted 2 strands at pin.
No. 2184 parted 12″ from pin.

HEMP CABLE, $\frac{16}{64}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2185.		No. 2186.		No. 2187.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*	*Inches.*
100	1.15	....	1.35	....	1.00	....
200	2.00	.85	2.20	.85	1.70	.70
300	2.65	.65	2.90	.70	2.80	1.10
400	3.90	1.25	3.70	.80	4.10	1.30
500	4.80	.90	4.40	.70	4.80	.70
600	5.60	.80	5.25	.85	5.40	.60
700	6.05	.45	6.00	.75	6.00	.60
800	6.70	.65	**6.30**	.30	6.40	.40
894	**7.00**	.30	....	....	....	....
900	....	....	....	....	**7.00**	.60

Mean tensile strength, 865 pounds.
No. 2185 parted at middle.

No. 2186, snapping sounds and strand began to part at 600 pounds. Parted 6″ from pin.

No. 2187 parted 1 strand 36″ from pin.

ITALIAN LINE, HEMP, $\frac{15}{64}$, 8 THREADS.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2188.		No. 2189.		No. 2190.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inch.*	*Inches.*	*Inch.*	*Inches.*	*Inches.*
100	1.60	....	1.50	....	1.50	....
200	2.45	.85	2.50	1.00	2.70	1.20
300	3.30	.85	3.25	.75	3.50	.80
400	3.80	.50	4.00	.75	4.30	.80
500	4.40	.60	4.50	.50	4.80	.50
600	5.00	.60	5.05	.55	5.40	.60
700	5.32	.32	5.50	.45	5.90	.50
796	**5.60**	.28	....	....	....	....
800	....	....	5.75	.25	6.30	.40
840	....	....	....	....	**6.40**	.10
900	....	....	6.30	.55	....	....
946	....	....	**6.40**	.10	....	....

Mean tensile strength, 861 pounds.
No. 2188 parted at the pin.
No. 2189 parted 36″ from the pin.
No. 2190 parted 6″ from the pin.

HEMP, SIZE, $\frac{3}{16}$″.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2191.		No. 2192.		No. 2193.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inch.*	*Inches.*	*Inch.*	*Inches.*	*Inch.*
100	2.50	....	2.20	....	2.25	....
150	3.25	.75	3.05	.85	3.00	.75
200	3.75	.50	3.70	.65	3.65	.65
250	4.10	.35	4.30	.60	4.05	.40
300	4.65	.55	4.65	.35	**4.40**	.35
322	....	....	**4.80**	.15	....	....
325	**4.80**	.15	....	....	....	....

Mean tensile strength, 316 pounds.
No. 2191 parted 18″ from the pin.
No. 2192 parted 36″ from the pin.
No. 2193 parted 24″ from the pin.

BEST RUSSIA HEMP, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2194.		No. 2195.		No. 2196.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
100	2.50	....	2.30	....	2.30	....
200	3.75	1.25	3.90	1.60	4.00	1.70
300	4.80	1.05	4.90	1.00	5.00	1.00
400	5.50	.70	5.35	.45	5.85	.85
460	....	....	**6.00**	.65	....	....
500	6.00	.50	....	....	**6.30**	**.45**
600	6.35	.35	....	....	....	....
665	**6.60**	.25	....	....	....	....

Mean tensile strength, 542 pounds.
No. 2194 parted 36″ from pin.
No. 2195 parted at the pin.
No. 2196 parted at the pin.

BEST RUSSIA HEMP, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2197.		No. 2198.		No. 2199.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inch.*	*Inches.*	*Inch.*	*Inches.*	*Inches.*
50	....	....	....	....	1.35	....
100	2.65	....	2.90	....	2.45	1.10
150	3.45	.80	3.50	.60	3.30	.85
200	4.00	.55	4.00	.50	3.90	.60
230	....	....	**4.60**	.60	....	....
250	4.50	.50	....	....	4.30	.40
295	....	....	....	....	**4.55**	.25
300	4.75	.25	....	....	....	....
348	**5.50**	.75	....	....	....	....

Mean tensile strength, 291 pounds.
No. 2197 parted at the pin.
No. 2198 parted at the pin.
No. 2199 parted 2 strands at middle.

BARBOUR'S BEST GILLING THREAD, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2200.		No. 2201.		No. 2202.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	....	....	3.05	....	2.10	....
100	3.25	....	3.90	.85	3.25	1.15
200	4.60	1.35	5.40	1.50	4.75	1.50
300	5.30	.70	6.20	.80	5.60	.85
400	6.00	.70	6.80	.60	6.15	.55
498	**6.50**	.50	....	....	....	....
500	....	....	....	....	6.30	.15
510	....	....	**7.30**	.50	....	....
585	....	....	....	....	**7.00**	.70

Mean tensile strength, 531 pounds.
No. 2200 parted 24″ from pin.
No. 2201 parted at the pin.
No. 2202 parted 24″ from pin.

BARBOUR'S BEST GILLING THREAD, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2203.		No. 2204.		No. 2205.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inch.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	....	....	1.65	....	3.00	....
100	4.70	....	4.00	2.35	4.40	1.40
150	5.60	.90	5.00	1.00	5.30	.90
200	6.40	.80	5.75	.75	6.00	.70
250	7.00	.60	6.40	.65	**6.40**	.40
260	**7.10**	.10	....	....	....	....
283	....	....	**7.00**	.60	....	....

Mean tensile strength, 264 pounds.
No. 2203 parted at the pin.
No. 2204 parted at the pin.
No. 2205 parted at middle.

BARBOUR'S LINEN SHOE THREAD, 6-THREAD, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2206.		No. 2207.		No. 2208.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
100	3.40	....	3.50	....	2.80	....
200	5.00	1.60	5.00	1.50	4.20	1.40
300	5.90	.90	5.75	.75	5.20	1.00
400	6.40	.50	6.30	.55	5.60	.40
465	**6.60**	.20	....	....	....	....
468	....	....	**6.60**	.30	....	....
492	....	....	....	....	**6.00**	.40

Mean tensile strength, 475 pounds.
No. 2206 parted at middle.
No. 2207 parted at middle.
No. 2208 parted 12″ from pin.

BARBOUR'S LINEN SHOE THREAD, 6-THREAD, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2209.		No. 2210.		No. 2211.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inches.*	*Inches.*
50	2.70	....	3.20	....	3.20	....
100	4.10	1.40	4.20	1.00	4.25	1.05
150	5.00	.90	5.00	.80	5.00	.75
200	5.40	.40	5.75	.75	5.60	.60
250	5.80	.40	6.20	.45	6.00	.40
260	....	....	**6.25**	.05	....	....
278	**5.90**	.10	....	....	....	....
292	....	....	....	....	**6.30**	.30

Mean tensile strength, 277 pounds.
No. 2209 parted 36″ from pin.
No. 2210 parted 6″ from pin.
No. 2211 parted 36″ from pin.

BARBOUR'S LINEN SHOE THREAD, 9-STRAND.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2212.		No. 2213.		No. 2214.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	....	....	2.70	....	2.70	....
100	4.20	....	3.75	1.05	4.10	1.40
200	5.70	1.50	5.20	1.45	5.80	1.70
300	6.70	1.00	6.20	1.00	6.80	1.00
400	7.40	.70	7.00	.80	7.70	.90
448	**8.00**	.60	....	....	....	....
495	....	....	....	....	**8.25**	.55
496	....	....	**7.40**	.40	....	....

Mean tensile strength, 480 pounds.
No. 2212 parted at the pin.
No. 2213 parted 8″ from pin.
No. 2214 parted 24″ from pin.

BARBOUR'S LINEN SHOE THREAD, 9-STRAND.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2215.		No. 2216.		No. 2217.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	3.10	....	3.50	....	3.70	....
100	4.70	1.60	5.20	1.70	5.10	1.40
150	5.50	.80	6.00	.80	5.80	.70
200	6.20	.70	6.70	.70	6.70	.90
250	6.80	.60	7.25	.55	7.25	.55
289	....	....	....	....	**7.50**	.25
292	**7.20**	.40	....	....	....	....
298	....	....	**7.40**	.15	....	....

Mean tensile strength, 293 pounds.
No. 2215 parted 24″ from pin.
No. 2216 parted at the middle.
No. 2217 parted at the pin.

BARBOUR'S LINEN SHOE THREAD, 11-THREAD, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2218.		No. 2219.		No. 2220.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.10		2.40		2.30	
100	3.10	1.00	3.50	1.10	3.10	.80
200	4.40	1.30	4.75	1.25	4.50	1.40
300	5.35	.95	5.60	.85	5.30	.80
400	6.10	.75	6.25	.65	6.00	.70
500	6.50	.40	6.90	.65	**6.40**	.40
510	**6.60**	.10				
560			**7.00**	.10		

Mean tensile strength, 523 pounds.
No. 2218 parted 8″ from the pin.
No. 2219 parted 36″ from the pin.
No. 2220 parted 6″ from the pin.

BARBOUR'S LINEN SHOE THREAD, 11-PLY, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2221.		No. 2222.		No. 2223.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	3.25		2.30		2.60	
100	4.30	1.05	4.25	1.95	4.00	1.40
150	5.20	.90	5.05	.80	4.80	.80
200	5.90	.70	5.80	.75	5.50	.70
247	**6.30**	.40				
250					6.00	.50
252			**6.40**	.60		
258					**6.10**	.10

Mean tensile strength, 252 pounds.
No. 2221 parted 12″ from pin.
No. 2222 parted 8″ from pin.
No. 2223 parted 36″ from pin.

"COY" BEST LINEN GILLING, NO. 16, 3-PLY, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2224.		No. 2225.		No. 2226.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.80	....	3.00	....	2.80	....
100	3.25	1.45	4.00	1.00	4.00	1.20
200	5.00	1.75	5.40	1.40	5.40	1.40
300	5.80	.80	6.30	.90	6.20	.80
380	**6.40**	.60	....	....	....	....
400	....	....	7.00	.70	6.80	.60
444	....	....	....	....	**7.00**	.20
466	....	....	**7.25**	.25	....	....

Mean tensile strength, 430 pounds.
No. 2224 parted 36″ from pin.
No. 2225 parted at middle.
No. 2226 parted at the pin.

"COY" BEST LINEN GILLING, NO. 16, 3-PLY, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2227.		No. 2228.		No. 2229.	
	Total	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	3.10	....	3.10	....	3.60	....
100	4.55	1.45	4.50	1.40	5.20	1.60
150	5.40	.85	5.40	.90	6.20	1.00
198	**6.00**	.60	....	....	....	....
200	....	....	....	....	**6.80**	.60
205	....	....	**6.30**	.90	....	....

Mean tensile strength, 201 pounds.
No. 2227 parted at the middle.
No. 2228 parted 8″ from pin.
No. 2229 parted 12″ from pin.

"COY" BEST LINEN GILLING, NO. 25, 2-PLY, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2230.		No. 2231.		No. 2232.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.60	....	2.00	....	1.40	....
100	3.00	1.40	3.20	1.20	2.70	1.30
200	4.25	1.25	4.70	1.50	3.95	1.25
300	5.10	.85	5.60	.90	5.00	1.05
398	....	....	**6.10**	.50	....	....
400	5.75	.65	....	....	5.50	.50
415	**6.00**	.25	....	....	....	....
445	....	....	....	....	**5.70**	.20

Mean tensile strength, 419 pounds.
No. 2230 parted 36″ from pin.
No. 2231 parted 6″ from pin.
No. 2232 parted at the pin.

"COY" BEST LINEN GILLING, NO. 25, 2-PLY, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2233.		No. 2234.		No. 2235.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inch.*
50	2.50	....	3.50	....	3.40	....
100	4.20	1.70	4.70	1.20	4.40	1.00
150	5.20	1.00	5.50	.80	5.12	.72
200	5.80	.60	6.00	.50	**5.60**	.48
225	....	....	**6.20**	.20	....	....
238	**6.00**	.20	....	....	....	....

Mean tensile strength, 221 pounds.
No. 2233 parted at the pin.
No. 2234 parted 12″ from pin.
No. 2235 parted 36″ from pin.

"COY" BEST LINEN GILLING, NO. 30, 2-PLY, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2325.		No. 2326.		No. 2327.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.25	....	2.00	....	1.75	....
100	3.50	1.25	3.00	1.00	3.00	1.25
200	4.90	1.40	4.60	1.60	4.40	1.40
300	6.00	1.10	5.40	.80	5.20	.80
400	6.58	.58	6.00	.60	6.00	.80
431	**7.00**	.42	....	....	....	....
448	....	....	**6.25**	.25	....	....
494	....	....	....	....	**6.25**	.25

Mean tensile strength, 458 pounds.
No. 2325 parted 1 strand at middle.
No. 2326 parted 12″ from pin.
No. 2327 parted at the pin.

"COY" BEST LINEN GILLING, NO. 30, 2-PLY, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2328.		No. 2329.		No. 2330.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inch.*
50	3.25	....	3.00	....	3.00	....
100	4.50	1.25	4.10	1.10	4.00	1.00
150	5.50	1.00	5.00	.90	4.90	.90
200	5.75	.25	5.50	.50	5.50	.60
224	**6.00**	.25	....	....	....	....
233	....	....	**6.00**	.50	....	....
236	....	....	....	....	**6.00**	.50

Mean tensile strength, 231 pounds.
No. 2328 parted at the pin.
No. 2329 parted 6″ from pin.
No. 2330 parted 6″ from pin.

"COY" BEST LINEN GILLING, NO. 30, 3-PLY, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2331.		No. 2332.		No. 2333.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.75	....	2.60	....	1.90	....
100	3.80	1.05	3.60	1.00	2.90	1.00
200	5.30	1.50	4.75	1.15	4.00	1.10
300	6.25	.95	5.80	1.05	5.00	1.00
395	**7.00**	.75	....	....	....	....
400	....	....	6.25	.45	5.50	.50
472	....	....	**6.70**	.45	....	....
496	....	....	....	....	**6.00**	.50

Mean tensile strength, 454 pounds.
No. 2331 parted 2 strands 8″ from the pin.
No. 2332 parted at the pin.
No. 2333 parted at the pin.

"COY" BEST LINEN GILLING, NO. 30, 3-PLY, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2334.		No. 2335.		No. 2336.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	3.20	....	2.70	....	3.00	....
100	4.30	1.10	3.75	1.05	4.25	1.25
150	5.30	1.00	4.60	.85	5.00	.75
200	5.75	.45	5.15	.55	5.60	.60
246	**6.20**	.45	....	....	**6.00**	.40
262	....	....	**5.75**	.60	....	....

Mean tensile strength, 251 pounds.
No. 2334 parted at the pin.
No. 2335 parted 12″ from pin.
No. 2336 parted 36″ from pin.

"Coy" Best Linen Gilling, No. 40, 2-Ply, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2337.		No. 2338.		No. 2339.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.45	....	1.95	....	1.70	....
100	3.40	.95	3.10	1.15	3.00	1.30
200	5.05	1.65	4.65	1.55	4.40	1.40
300	6.00	.95	5.50	.85	5.25	.85
335	**6.30**	.30	....	....	....	....
405	....	....	**6.15**	.65	....	....
420	....	....	....	....	**5.85**	.60
0	....	....	....	....	.50	....

Mean tensile strength, 387 pounds.
No. 2337 parted 8″ from the pin.
No. 2338 parted 12″ from the pin.
No. 2339 parted 6″ from the pin.

"Coy" Best Linen Gilling, No. 40, 2-Ply, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2340.		No. 2341.		No. 2342.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.80	....	2.40	....	3.40	....
100	4.30	1.50	4.00	1.60	4.70	1.30
150	5.20	.90	5.00	1.00	5.50	.80
190	....	....	....	....	**6.00**	.50
200	6.00	.80	5.35	.35	....	....
212	....	....	**5.50**	.15	....	....
228	**6.40**	.40	....	....	....	....

Mean tensile strength, 210 pounds.
No. 2340 parted at pin.
No. 2341 parted 12″ from pin.
No. 2342 parted 2 strands 24″ from pin.

SMITH & DOVE SAIL TWINE, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2343.		No. 2344.		No. 2345.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inch.*	*Inches.*	*Inch.*	*Inches.*	*Inch.*
50	....	....	1.80	....	1.20	....
100	2.00	....	2.40	.60	1.80	.60
200	3.00	1.00	3.35	.95	2.75	.95
300	3.50	.50	4.00	.65	3.40	.65
400	4.00	.50	4.50	.50	3.90	.50
500	4.30	.30	5.00	.50	4.20	.30
600	4.75	.45	5.40	.40	4.50	.30
655	**5.00**	.25	....	....	....	....
660	....	....	**5.50**	.10	....	....
674	....	....	....	....	**4.75**	.25
0	....	....	....	....	.50	....

Mean tensile strength, 663 pounds.
No. 2343 parted at the pin.
No. 2344 parted 10″ from pin.
No. 2345 parted at the pin.

SMITH & DOVE SAIL TWINE, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2346.		No. 2347.		No. 2348.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inch.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.90	....	1.50	....	1.40	....
100	2.70	.80	2.30	.80	2.20	.80
150	3.50	.80	....	....	....	....
200	4.00	.50	3.50	1.20	3.45	1.25
250	4.40	.40	....	....	....	....
300	4.75	.35	4.35	.85	4.30	.85
350	5.10	.35	....	....	....	....
400	5.40	.30	5.00	.65	4.90	.60
420	....	....	**5.10**	.10	....	....
437	**5.50**	.10	....	....	....	....
464	....	....	....	....	**5.10**	.20

Mean tensile strength, 440 pounds.
No. 2346 parted 24″ from pin.
No. 2347 parted 2 strands 36″ from pin.
No. 2348 parted at the pin.

MARSHALL'S LINEN THREAD, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2349.		No. 2350.		No. 2351.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.60	....	2.90	....	2.60	....
100	3.75	1.15	4.10	1.20	3.80	1.20
200	5.40	1.65	5.50	1.40	5.25	1.45
300	6.15	.75	6.40	.90	6.00	.75
400	6.90	.75	7.15	.75	6.70	.70
420	**7.00**	.10	....	....	....	....
0	2.00	....	....	....	....	....
472	....	....	**7.30**	.15	....	....
482	....	....	....	....	**7.00**	.30
0	....	....	....	....	1.50	....

Mean tensile strength, 458 pounds.
No. 2349 parted at the pin.
No. 2350 parted at the pin.
No. 2351 parted at the pin.

MARSHALL'S LINEN THREAD, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2352.		No. 2353.		No. 2354.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inch.*
50	2.70	....	2.90	....	3.10	....
100	4.00	1.30	3.80	.90	4.00	.90
150	5.00	1.00	4.50	.70	5.00	1.00
200	5.50	.50	....	....	5.50	.50
250	6.00	.50	5.60	1.10	6.00	.50
294	....	....	**6.00**	.40	....	....
282	**6.35**	.35	....	....	....	....
289	....	....	....	....	**6.30**	.30

Mean tensile strength, 288 pounds.
No. 2352 parted 24″ from the pin.
No. 2353 parted 36″ from the pin.
No. 2354 parted 12″ from the pin.

Best Italian Hemp, $\frac{7}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2355.		No. 2356.		No. 2357.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inch.*	*Inches.*	*Inches.*	*Inches.*	*Inch.*
50	.85	....	1.10	....	1.40	....
100	1.50	.65	1.80	.70	1.80	.40
200	2.40	.90	3.00	1.20	2.80	1.00
300	3.10	.70	3.75	.75	3.50	.70
400	3.75	.65	4.25	.50	4.10	.60
500	4.10	.35	4.80	.55	....	....
525	....	....	....	....	**4.60**	.50
544	....	....	**4.95**	.15	....	....
620	**4.60**	.50	....	....	....	....

Mean tensile strength, 563 pounds.
No. 2355 parted 36″ from pin.
No. 2356 parted at the pin.
No. 2357 parted 2 strands 36″ from pin.

Best Italian Hemp, $\frac{4}{32}$.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2358.		No. 2359.		No. 2360.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inch.*	*Inches.*	*Inch.*	*Inches.*	*Inches.*
50	2.10	....	2.10	....	2.10	....
100	3.10	1.00	3.10	1.00	3.20	1.10
150	4.00	.90	3.75	.65	4.00	.80
200	4.50	.50	4.25	.50	4.40	.40
250	5.00	.50	4.75	.50	**5.00**	.60
268	....	....	**4.85**	.10	....	....
295	**5.25**	.25	....	....	....	....

Mean tensile strength, 271 pounds.
No. 2358 parted at middle.
No. 2359 parted 5″ from pin.
No. 2360 parted 3″ from pin.

No. 3 W. E. H. & Son Cotton.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2361.		No. 2362.		No. 2363.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	5.00	....	6.40	....	4.20	....
100	6.40	1.40	8.20	1.80	6.00	1.80
150	8.00	1.60	9.80	1.60	7.75	1.75
200	9.25	1.25	11.40	1.60	9.25	1.50
250	10.50	1.25	12.60	1.20	10.60	1.35
300	11.60	1.10	13.65	1.05	11.90	1.30
347	**13.00**	1.40	....	....	....	....
350	....	....	**14.80**	1.15	12.85	.95
397	....	....	....	....	**13.80**	.95

Mean tensile strength, 365 pounds.
No. 2361 parted 24″ from pin.
No. 2362 parted at middle.
No. 2363 parted 12″ from pin.

$\frac{3}{16}$ or No. 6 W. E. H. & Son Cotton.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2364.		No. 2365.		No. 2366.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	4.50	....	4.40	....	4.15	....
100	6.40	1.90	6.50	2.10	6.10	1.95
150	7.90	1.50	8.30	1.80	7.75	1.65
200	9.50	1.60	9.75	1.45	9.30	1.55
250	10.65	1.15	10.80	1.05	10.50	1.20
300	11.90	1.25	11.90	1.10	11.50	1.00
350	12.65	.75	12.85	.95	12.65	1.15
400	13.40	.75	13.70	.85	13.60	1.05
432	**14.00**	.60	....	....	....	....
0	5.00	....	....	....	....	....
435	....	....	**14.00**	.30	....	....
0	....	....	4.75	....	....	....
448	....	....	....	....	**13.75**	.15

Mean tensile strength, 438 pounds.
No. 2364 parted at the pin.
No. 2365 parted at the pin.
No. 2366 parted 12″ from pin.

$\frac{1}{4}$ OR NO. 8 W. E. H. & SON COTTON.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2367.		No. 2368.		No. 2369.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	4.75	....	3.80	....	3.60	....
100	6.75	2.00	6.00	2.20	5.50	1.90
200	9.80	3.05	9.00	3.00	9.00	3.50
300	12.20	2.40	11.50	2.50	11.50	2.50
400	14.20	2.00	13.00	1.50	13.40	1.90
500	15.50	1.30	14.75	1.75	15.00	1.60
600	17.00	1.50	16.00	1.25	16.40	1.40
676	....	....	**16.50**	.50	....	....
0	....	....	6.20	....	....	....
700	**18.25**	1.25	....	....	....	....
0	7.00	....	....	....	....	....
710	....	....	....	....	**17.80**	1.40
0	....	....	....	....	6.75	....

Mean tensile strength, 695 pounds.
No. 2367 parted at the pin.
No. 2368 parted at the pin.
No. 2369 parted at the pin.

NO. 2 W. E. H. & SON COTTON.

[Twisted line.]

Applied loads.	Elongation in 6 feet.					
	No. 2255.		No. 2256.		No. 2257.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	8.50	....	8.25	....	7.50	....
100	11.40	2.90	12.00	3.75	10.00	2.50
150	13.60	2.20	14.50	2.50	13.00	3.00
200	15.75	2.15	16.25	1.75	15.25	2.25
242	....	....	....	....	**16.20**	.95
0	....	....	....	....	6.00	....
250	17.00	1.25	16.75	.50	....	....
262	**17.25**	.25	....	....	....	....
292	....	....	**19.00**	2.25	....	....

Mean tensile strength, 265 pounds.
No. 2255 parted 24″ from the pin.
No. 2256 parted at the pin.
No. 2257 parted 6″ from the pin.

SHOT LINES.

DETAILS OF TESTS OF BRAIDED LINES.

FIRST SERIES.

NO. 4 SHOT LINE.

"Coy" best linen gilling, No. 25, 2-ply.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2236.		No. 2237.		No. 2238.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	3.40	....	3.40	....	3.70	....
100	6.00	2.60	5.60	2.20	5.80	2.10
150	7.60	1.60	7.30	1.70	7.75	1.95
190	**8.40**	.80	....	....	....	....
192	....	....	....	....	**8.60**	.85
200	....	....	**8.50**	1.20	....	....

Mean tensile strength, 194 pounds.
No. 2236 parted 15″ from pin.
No. 2237 parted 3″ from pin.
No. 2238 parted 36″ from pin.

NO. 4 SHOT LINE.

Smith & Dove No. 16 5-ply linen shoe-thread.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2239.		No. 2240.		No. 2241.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.05	....	1.45	....	1.40	....
75	....	....	....	....	3.00	1.60
100	3.40	2.35	9.10	7.65	8.65	5.65
125	....	....	....	....	11.25	2.60
136	....	....	....	....	**12.60**	1.35
143	....	....	**11.40**	2.30	....	....
150	11.00	7.60	....	....	....	....
153	**11.50**	.50	....	....	....	....

Mean tensile strength, 144 pounds.
No. 2239 parted 36″ from pin.
No. 2240 parted 2″ from pin.
No. 2241 parted at middle.

NO. 4 SHOT LINE.

Barbour's 9-cord linen shoe-thread, 95 cents.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2242.		No. 2243.		No. 2244.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	3.90	....	4.30	....	4.50	....
75	4.90	1.00	....	....	....	....
100	6.00	1.10	6.40	2.10	6.65	2.15
125	6.90	.90	....	....	....	....
150	7.40	.50	7.75	1.35	8.10	1.45
175	8.10	.70	....	....	....	....
196	....	....	....	....	**8.60**	.50
197	....	....	**8.25**	.50	....	....
200	**8.65**	.55	....	....	....	....

Mean tensile strength, 198 pounds.
No. 2242 parted 24″ from the pin.
No. 2243 parted 15″ from the pin.
No. 2244 parted at the middle.

NO. 4 SHOT LINE.

Barbour's 8-cord linen shoe-thread, 95 cents per pound. Same stock as Barbour's 11-cord, at 95 cents per pound.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2245.		No. 2246.		No. 2247.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	4.25	....	4.40	....	3.45	....
100	6.50	2.25	6.40	2.00	5.60	2.15
150	8.15	1.65	7.75	1.35	7.25	1.65
181	....	....	**8.80**	1.05	....	....
197	....	....	....	....	**8.00**	.75
199	**9.10**	.95	....	....	....	....

Mean tensile strength, 192 pounds.
No. 2245 parted 36″ from the pin.
No. 2246 parted 36″ from the pin.
No. 2247 parted at the middle.

No. 4 Shot Line.

Barbour's 6-cord linen shoe-thread, 95 *cents per pound.*

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2248.		No. 2249.		No. 2250.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	4.25	....	5.00	....	5.20	....
100	7.20	2.95	7.65	2.65	7.70	2.50
150	8.70	1.50	9.10	1.45	9.25	1.55
169	**9.25**	.55	....	....	....	....
172	....	....	**10.00**	.90	**9.75**	.50

Mean tensile strength, 171 pounds.
No. 2248 parted 24″ from pin.
No. 2249 parted 8″ from pin.
No. 2250 parted 24″ from pin.

No. 4 Shot Line.

No. 12, 3-*ply cotton yarn.*

[Braided line.]

Applied loads.	Elongation in 6 feet.							
	No. 2251.		No. 2252.		No. 2253.		No. 2254.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	8.50	....	11.50	....	9.00	....	11.00	....
75	12.40	3.90	....	....	12.50	3.50	14.00	3.00
100	14.00	1.60	16.00	4.50	15.00	2.50	16.00	2.00
122	....	....	....	....	....	....	**17.50**	1.50
127	....	....	**17.50**	1.50	....	....	....	....
140	....	....	....	....	**17.50**	2.50	....	....
150	**17.50**	3.50	....	....	....	....	....	....

Mean tensile strength, 135 pounds.
No. 2251 parted 24″ from the pin.
No. 2252 parted at the middle.
No. 2253 parted 24″ from the pin.
No. 2254 parted at the middle.

No. 4 Shot Line.

Barbour's best gilling thread (linen).

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2259.		No. 2260.		No. 2261.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inch.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.60	....	2.20	....	2.90	....
100	3.60	1.00	3.25	1.05	4.10	1.20
150	4.50	.90	4.20	1.05	5.30	1.20
200	5.40	.90	4.95	.75	6.20	.90
250	6.00	.60	5.55	.60	7.00	.80
276	**6.35**	.35	....	....	**7.20**	.20
282	....	....	**6.20**	.65	....	....

Mean tensile strength, 278 pounds.
No. 2259 parted 5″ from the pin.
No. 2260 parted at the pin.
No. 2261 parted at the pin.

No. 4 Shot Line.

"Coy" best linen gilling, No. 30, 2-ply.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2262.		No. 2263.		No. 2264.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.60	....	2.75	....	2.35	....
100	4.10	1.50	4.00	1.25	3.60	1.25
150	5.20	1.10	5.05	1.05	4.55	.95
200	6.00	.80	5.80	.75	5.50	.95
250	6.65	.65	6.75	.95	6.10	.60
268	....	....	....	....	**6.25**	.15
298	....	....	**7.40**	.65	....	....
300	**7.40**	.75	....	....	....	....

Mean tensile strength, 289 pounds.
No. 2262 parted 24″ from pin.
No. 2263 parted at the pin.
No. 2264 parted 36″ from pin.

No. 4 Shot Line.

"Coy" best linen gilling, No. 16, *3-ply.*

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2265.		No. 2266.		No. 2267.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.75	....	2.75	....	2.60	....
100	4.40	1.65	4.35	1.60	4.25	1.65
150	5.75	1.35	5.50	1.15	5.60	1.35
200	6.70	.95	6.50	1.00	6.50	.90
232	....	....	....	....	**7.00**	.50
236	**7.20**	.50	....	....	....	....
237	....	....	**7.15**	.65	....	....

Mean tensile strength, 235 pounds.
No. 2265 parted at the pin.
No. 2266 parted 24″ from pin.
No. 2267 parted 24″ from pin.

No. 4 Shot Line

Smith & Dove best linen sail twine.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2265*a*.		No. 2266*a*.		No. 2267*a*.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.80	....	1.05	....	1.30	....
60	....	....	3.00	1.95	....	....
75	....	....	5.20	2.20	5.50	4.20
100	8.00	6.20	7.25	2.05	7.30	1.80
125	....	....	8.50	1.25	8.80	1.50
150	**10.25**	2.25	9.75	1.25	....	....
152	....	....	....	....	**10.00**	1.20
156	....	....	**10.00**	.25	....	....

Mean tensile strength, 153 pounds.
No. 2265*a* parted 24″ from pin.
No. 2266*a* parted 12″ from pin.
No. 2267*a* parted 24″ from pin.

No. 4 SHOT LINE.

Italian hemp.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2268.		No. 2269.		No. 2270.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.00	....	2.10	....	1.65	....
100	3.60	1.60	3.65	1.55	3.25	1.60
150	5.00	1.40	4.85	1.20	4.30	1.05
184	**6.00**	1.00	....	....	....	....
200	....	....	6.00	1.15	....	....
205	....	....	....	....	**5.40**	1.10
216	....	....	**6.25**	.25	....	....

Mean tensile strength, 202 pounds.
No. 2268 parted at the pin.
No. 2269 parted 24″ from pin.
No. 2270 parted 24″ from pin.

No. 4 SHOT LINE.

"Coy" best linen gilling, No. 30, 3-*ply.*

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2271.		No. 2272.		No. 2273.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.60	....	3.25	....	3.60	....
100	3.60	1.00	4.40	1.15	5.00	1.40
150	4.80	1.20	5.65	1.25	6.20	1.20
200	5.40	.60	6.50	.85	7.20	1.00
250	6.30	.90	7.25	.75	8.00	.80
260	....	....	....	....	**8.20**	.20
281	**6.60**	.30	**8.00**	.75	....	....

Mean tensile strength, 274 pounds.
No. 2271 parted at the pin.
No. 2272 parted 36″ from pin.
No. 2273 parted 12″ from pin.

NO. 4 SHOT LINE.

"Coy" best linen gilling, No. 40, 2-ply.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2274.		No. 2275.		No. 2276.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.75	....	2.80	....	1.80	....
100	5.50	2.75	5.30	2.50	4.50	2.70
150	7.35	1.85	7.10	1.80	6.40	1.90
200	8.45	1.10	8.30	1.20	7.60	1.20
236	....	....	**9.20**	.90	....	....
244	**9.60**	1.15	....	....	....	....
250	....	....	....	....	9.00	1.40
260	....	....	....	....	**9.20**	.20

Mean tensile strength, 247 pounds.
No. 2274 parted 24″ from pin.
No. 2275 parted 15″ from pin.
No. 2276 parted 24″ from pin.

NO. 4 SHOT LINE.

No. 25 3-ply Marshall's linen thread.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2277.		No. 2278.		No. 2279.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	3.50	....	3.40	....	2.70	....
100	5.10	1.60	5.40	2.00	4.90	2.20
150	6.40	1.30	6.75	1.35	6.35	1.45
200	7.35	.95	8.00	1.25	7.50	1.15
230	....	....	**8.40**	.40	....	....
233	**8.00**	.65	....	....	....	....
249	....	....	....	....	**8.40**	.90

Mean tensile strength, 237 pounds.
No. 2277 parted 12″ from the pin.
No. 2278 parted 36″ from the pin.
No. 2279 parted at the middle.

No. 7 Shot Line.

"Coy" best linen gilling, No. 16, 3-ply.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2280.		No. 2281.		No. 2282.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.40	....	1.60	....	1.65	....
100	2.75	1.35	2.40	.80	2.40	.75
200	4.85	2.10	5.10	2.70	5.20	2.80
300	6.80	1.95	7.00	1.90	7.20	2.00
400	8.40	1.60	8.75	1.75	8.85	1.65
461	....	....	**9.50**	.75	....	....
466	....	....	....	....	**10.00**	1.15
473	**9.50**	1.10	....	....	....	....

Mean tensile strength, 467 pounds.
No. 2280 parted at the middle.
No. 2281 parted at the middle.
No. 2282 parted at the middle.

No. 7 Shot Line.

"Coy" best linen gilling, No. 25, 2-ply.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2283.		No. 2284.		No. 2285.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.10	....	2.00	....	1.60	....
100	3.25	1.15	3.00	1.00	2.75	1.15
200	4.85	1.60	4.70	1.70	4.45	1.70
300	6.25	1.40	6.00	1.30	5.80	1.35
400	7.50	1.25	7.20	1.20	7.00	1.20
500	8.70	1.20	....	....	....	....
505	....	....	**8.40**	1.20	....	....
512	....	....	....	....	**8.25**	1.25
514	**9.00**	.30	....	....	....	....

Mean tensile strength, 510 pounds.
No. 2283 parted at the pin.
No. 2284 parted 24″ from pin.
No. 2285 parted 24″ from pin.

NO. 7 SHOT LINE.

"Coy" best linen gilling, No. 30, *2-ply.*

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2286.		No. 2287.		No. 2288.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.75	....	1.75	....	1.65	....
100	3.00	1.25	2.60	.85	2.25	.60
200	5.50	2.50	5.20	2.60	5.00	2.75
300	7.40	1.90	7.25	2.05	7.00	2.00
400	9.10	1.70	....	....	8.50	1.50
405	....	....	**9.00**	1.75	....	....
482	**10.20**	1.10	....	....	....	....
497	....	....	....	....	**9.75**	1.25

Mean tensile strength, 461 pounds.
No. 2286 parted 36″ from pin.
No. 2287 parted at the pin.
No. 2288 parted 8″ from pin.

NO. 7 SHOT LINE.

"Coy" best linen gilling, No. 30, *3-ply.*

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2289.		No. 2290.		No. 2291.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.75	....	1.20	....	1.00	....
100	2.20	45	2.20	1.00	1.70	.70
200	5.50	3.30	5.20	3.00	5.00	3.30
300	7.65	2.15	7.00	1.80	7.00	2.00
400	9.20	1.55	8.70	1.70	8.55	1.55
415	....	....	....	....	**9.00**	.45
450	**10.00**	.80	**9.25**	.55	....	....
0	1.12	....	....	....	....	....

Mean tensile strength, 438 pounds.
No. 2289 parted at the pin.
No. 2290 parted at the pin.
No. 2291 parted 36″ from pin.

NO. 7 SHOT LINE.

"Coy" best linen gilling, No. 40, 2-ply.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2292.		No. 2293.		No. 2294.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.40	....	2.00	....	....	....
100	3.20	.80	2.90	.90	2.90	....
200	6.65	3.45	6.00	3.10	6.00	3.10
300	9.20	2.55	8.60	2.60	8.40	2.40
400	11.10	1.90	10.40	1.80	10.20	1.80
454	**12.50**	1.40	....	....	....	....
0	3.75	....	....	....	....	....
465	....	....	**11.40**	1.00	....	....
0	....	....	6.70	....	....	....
425	....	....	11.00	....	....	....
500	....	....	....	....	**12.00**	1.80
0	....	....	....	....	3.00	....

Mean tensile strength, 473 pounds.
No. 2292 parted 6″ from pin.
No. 2293 parted at the pin.
No. 2294 parted 24″ from pin.

NO. 7 SHOT LINE.

Barbour's 6-cord linen shoe-thread, 57 cents per pound.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2295.		No. 2296.		No. 2297.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.20	....	2.00	....	2.00	....
100	2.25	.95	3.00	1.00	3.00	1.00
200	3.65	1.40	4.40	1.40	4.25	1.25
300	4.70	1.05	5.40	1.00	5.20	.95
400	5.50	.80	6.15	.75	6.00	.80
492	**6.40**	.90	....	....	....	....
500	....	....	**6.90**	.75	6.70	.70
555	....	....	....	....	**7.10**	.40

Mean tensile strength, 516 pounds.
No. 2295 parted 8″ from pin.
No. 2296 parted at the middle.
No. 2297 parted 12″ from pin.

NO. 7 SHOT LINE.

Barbour's 9-cord linen shoe-thread, 95 cents per pound.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2298.		No. 2299.		No. 2300.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.50	....	1.65	....	1.90	....
100	2.40	.90	2.30	.65	2.40	.50
200	6.25	3.85	6.75	4.45	5.90	3.50
300	8.40	2.15	9.00	1.25	7.90	2.00
400	10.00	1.60	10.40	1.40	9.65	1.75
474	....	....	**11.50**	1.10	....	....
482	....	....	....	....	**10.50**	.85
493	**11.00**	1.00	....	....	....	....
0	3.40	....	....	....	....	....

Mean tensile strength, 483 pounds.
No. 2298 parted at the pin.
No. 2299 parted 24″ from pin.
No. 2300 parted 24″ from pin.

NO. 7 SHOT LINE.

Barbour's 11-cord linen shoe-thread, 95 cents per pound.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2301.		No. 2302.		No. 2303.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.90	....	1.75	....	2.10	....
100	3.00	1.10	2.60	.85	2.75	.65
200	4.50	1.50	4.10	1.50	4.20	1.45
300	5.80	1.30	5.30	1.20	5.40	1.20
400	6.85	1.05	6.40	1.10	6.55	1.15
492	....	....	....	....	**7.20**	.65
500	8.00	1.15	**7.30**	.90	....	....
520	**8.20**	.20	....	....	....	....

Mean tensile strength, 504 pounds.
No. 2301 parted 6″ from pin.
No. 2302 parted 15″ from pin.
No. 2303 parted 36″ from pin.

No. 7 Shot Line.

Barbour's best gilling thread (linen).

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2304.		No. 2305.		No. 2306.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.00	....	2.10	....	1.70	....
100	3.00	1.00	3.35	1.25	2.60	.90
200	5.20	2.20	5.20	1.85	4.35	1.75
300	6.70	1.50	6.80	1.60	6.00	1.65
400	8.00	1.30	8.20	1.40	7.20	1.20
478	**9.00**	1.00	....	....	....	....
500	....	....	....	....	8.20	1.00
510	....	....	**9.50**	1.30	....	....
527	....	....	....	....	**8.60**	.40

Mean tensile strength, 505 pounds.
No. 2304 parted 18″ from pin.
No. 2305 parted 6″ from pin.
No. 2306 parted 24″ from pin.

No. 7 Shot Line.

Smith & Dove No. 16, 5-ply (linen shoe-thread).

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2307.		No. 2308.		No. 2309.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.25	....	1.90	....	2.30	....
100	3.30	1.05	2.80	.90	3.00	.70
200	5.10	1.80	4.40	1.60	4.65	1.65
300	7.20	2.10	6.75	2.35	6.70	2.05
400	8.70	1.50	8.20	1.45	8.30	1.60
489	....	....	**9.00**	.80	....	....
492	....	....	....	....	**9.00**	.70
500	10.15	1.45	....	....	....	....
527	**10.90**	.75	....	....	....	....

Mean tensile strength, 505 pounds.
No. 2307 parted 6″ from pin.
No. 2308 parted 24″ from pin.
No. 2309 parted at middle.

NO. 7 SHOT LINE.

Smith & Dove's best linen sail twine.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2310.		No. 2311.		No. 2312.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	.75		.65		.70	
100	1.00	.25	.85	.20	1.00	.30
150			1.25	.40	1.35	.35
188					1.45	.10
190			1.75	.50		
200	3.20	2.20	3.40	1.65	3.10	1.65
250	7.50	4.30	8.40	5.00	9.05	5.95
300	10.70	3.20	10.20	1.80	10.70	1.65
350			12.40	2.20	12.40	1.70
360			12.70	.30		
0			10.00			
370					**13.40**	1.00
0					10.00	
366					13.25	
378	**13.20**	2.50				
396			**13.40**	.70		

Mean tensile strength, 381 pounds.
No. 2310 parted 12″ from pin.
No. 2311 parted 6″ from pin.
No. 2312 parted at middle.

NO. 7 SHOT LINE.

Marshall's linen thread.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2313.		No. 2314.		No. 2315.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	1.00		1.50		.90	
100	1.50	.50	2.20	.70	1.65	.75
200	4.30	2.80	5.00	2.80	4.50	2.85
300	6.00	1.70	7.00	2.00	6.40	1.90
400	7.50	1.50	8.40	1.40	8.00	1.60
471			**9.30**	.90		
476					**8.75**	.75
478	**8.40**	.90				

Mean tensile strength, 475 pounds.
No. 2313 parted 24″ from pin.
No. 2314 parted 36″ from pin.
No. 2315 parted at the pin.

NO. 7 SHOT LINE.

Italian hemp.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2316.		No. 2317.		No. 2318.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.00	....	1.40	....	1.45	....
100	3.10	1.10	2.65	1.25	2.75	1.30
200	5.10	2.00	4.60	1.95	4.65	1.90
300	6.85	1.75	6.50	1.90	6.35	1.70
400	8.20	1.35	8.25	1.75	8.00	1.65
478	....	....	**9.30**	1.05	....	....
497	**9.50**	1.30	....	....	....	....
500	....	....	....	....	9.40	1.40
522	....	....	....	....	**9.65**	.25

Mean tensile strength, 499 pounds.
No. 2316 parted at the middle.
No. 2317 parted 24″ from the pin.
No. 2318 parted ″.12 from the pin.

NO. 7 SHOT LINE.

No. 12 3-ply cotton yarn.

[Braided line.]

Applied loads.	Elongation in 6 feet.					
	No. 2319.		No. 2320.		No. 2321.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	3.60	....	3.10	....	3.00	....
100	6.20	2.60	5.30	2.20	5.40	2.40
150	8.60	2.40	8.00	2.70	8.00	2.60
200	11.00	2.40	10.40	2.40	10.00	2.00
244	12.60	1.60	....	....	....	....
0	7.75	....	....	....	....	....
250	13.30	.70	12.40	2.00	12.00	2.00
300	14.80	1.50	14.00	1.60	13.50	1.50
350	16.40	1.60	15.50	1.50	15.40	1.90
374	**17.45**	1.05	**16.50**	1.00	....	....
0	10.80	....	4.30	....	....	....
265	17.20	....	....	....	....	....
394	....	....	....	....	**17.00**	1.60

Mean tensile strength, 381 pounds.
No. 2319 parted 15″ from the pin.
No. 2320 parted at the pin.
No. 2321 parted at middle.

¼″ *Russia hemp.*

[Twisted.]

Applied loads.	Elongation in 6 feet.					
	No. 2322.		No. 2323.		No. 2324.	
	Total.	Successive.	Total.	Successive.	Total.	Successive.
Pounds.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
50	2.00	....	2.25	....	2.00	....
100	3.00	1.00	3.10	.85	2.75	.75
200	4.00	1.00	4.35	1.25	4.00	1.25
300	5.00	1.00	5.10	.75	4.90	.90
400	5.55	.55	5.75	.65	5.50	.60
500	6.00	.45	6.20	.45	6.00	.50
600	6.50	.50	6.70	.50	6.45	.45
700	7.00	.50	7.05	.35	6.90	.45
800	7.25	.25	**7.30**	.25	....	....
815	....	....	....	....	**7.10**	.20
892	**8.00**	.75	....	....	....	....
0	4.10	....	....	....	....	....

Mean tensile strength, 836 pounds.
No. 2322 parted at the pin.
No. 2323 parted at the pin.
No. 2324 parted at the pin.

SHOT-LINE TESTS.

TABLE NO. 2.—SECOND SERIES

TESTS IN WHICH PERMANENT SETS WERE OBSERVED BEFORE FINAL RUPTURE OF THE LINES.

[See details of tests which follow.]

No. of test.	Marks.	Line furnished by—	Kind.	Tensile strength.	Elongation in 6 feet.		Remarks.
				Pounds.	*Inches.*	*Per ct.*	
2370	Pure manilla, size $\frac{15}{64}$	Sewall & Day	Twisted	845	8.25	11.5	
2371	Pure manilla, size $\frac{16}{64}$	do	do	670	9.40	13.0	
2372	Hemp cable, size $\frac{16}{64}$	do	do	842	7.15	9.9	
2373	Italian line, $\frac{15}{64}$, 8-thread (hemp)	do	do	840	7.50	10.4	
2389	$\frac{7}{32}$ "Coy" best linen gilling, No. 16, 3-ply	M. F. Whiton & Co	do	428	7.15	9.9	
2390	$\frac{7}{32}$ "Coy" best linen gilling, No. 25, 2-ply	do	do	405	5.75	8.0	
2391	$\frac{7}{32}$ "Coy" best linen gilling, No. 30, 2-ply	do	do	400	6.25	8.7	
2392	do	do	do	410	6.70	9.3	
2393	$\frac{7}{32}$ "Coy" best linen gilling, No. 30, 3-ply	do	do	492	6.55	9.1	
2394	$\frac{7}{32}$ "Coy" best linen gilling, No. 40, 2-ply	do	do	425	6.70	9.3	
2395	$\frac{7}{32}$ Barbour's linen shoe-thread, 6-thread	do	do	471	7.00	9.7	
2396	$\frac{7}{32}$ Barbour's linen shoe-thread, 9-strand	do	do	508	9.30	12.9	
2397	$\frac{7}{32}$ Barbour's linen shoe-thread, 11-thread	do	do	568	6.60	9.2	
2398	$\frac{7}{32}$ Barbour's best gilling thread	do	do	582	6.90	9.6	
2399	$\frac{7}{32}$ Smith & Dove sail twine	do	do	645	5.60	7.8	
2400	$\frac{7}{32}$ Marshall's linen thread	do	do	482	6.80	9.4	
2401	Best Italian hemp, $\frac{7}{32}$	do	do	448	5.70	7.9	
2402	$\frac{7}{32}$ best Russia hemp	do	do	670	7.80	10.8	
2403	No. 5 W. E. H. & Son cotton	do	do	388	15.50	21.5	
2404	$\frac{3}{16}$ or No. 6 W. E. H. & Son cotton	do	do	390	14.00	19.4	
2305	$\frac{1}{4}$ or No. 8 W. E. H. & Son cotton	do	do	606	18.20	25.3	
2374	"Coy" best linen gilling, No. 16, 3-ply	Silver Lake Company	Braided	447	9.80	13.6	No. 7 shot lines.
2375	"Coy" best linen gilling, No. 25, 2-ply	do	do	520	9.60	13.3	
2376	"Coy" best linen gilling, No. 30, 2-ply	do	do	510	10.35	14.4	
2377	"Coy" best linen gilling, No. 30, 3-ply	do	do	451	8.75	12.1	
2378	"Coy" best linen gilling, No. 40, 2-ply	do	do	468	12.70	17.6	
2379	Barbour's 6-cord linen shoe-thread, 57 cents per pound	do	do	567	6.90	9.6	
2380	Barbour's 9-cord linen shoe-thread, 95 cents	do	do	505	11.50	16.0	
2381	Barbour's 11-cord linen shoe-thread, 95 cents per pound	do	do	495	.....	.....	
2382	Barbour's best gilling thread	do	do	524	9.45	13.1	
2383	Smith & Dove, No. 16, 5-ply linen shoe-thread	do	do	524	9.60	13.3	
2384	Smith & Dove's best linen sail twine	do	do	368	13.00	18.1	No. 4 shot line.
2385	No. 25 3-ply Marshall's linen thread	do	do	494	9.40	13.0	No. 7 shot lines.
2386	Italian hemp	do	do	476	9.00	12.5	
2387	No. 12 3-ply cotton yarn	do	do	371	16.20	22.5	
2388	$\frac{1}{4}$″ Russia hemp	do	Twisted	800	6.70	9.3	

SHOT LINES.

DETAILS OF TESTS, SECOND SERIES.

No. 2370.

PURE MANILLA, SIZE $\frac{15}{64}$.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	2.34	....	....	
200	3.58	1.24	1.60	Twisted line.
300	4.80	1.22	....	
400	5.95	1.15	3.65	
500	6.65	.70	....	
600	7.37	.72	....	
500	7.30	— .07	....	
400	7.20	— .10	....	
300	7.00	— .20	....	
200	6.73	— .27	....	
100	6.42	— .31	5.10	
100	5.72	+ .62	....	
200	6.12	.40	....	
300	6.60	.48	....	
400	6.91	.31	....	
500	7.20	.29	....	
600	7.50	.30	....	
700	7.85	.35	....	
800	8.15	.30	....	
845	8.25	.10	....	Tensile strength.
0	....	....	5.50	

Parted at the pin.

No. 2371.

PURE MANILLA CABLE, SIZE $\frac{16}{64}$.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	1.36	....	....	
200	2.34	.98	.88	Twisted line.
300	4.52	2.18	....	
400	6.83	2.31	4.25	
500	8.05	1.22	....	
600	9.15	1.10	....	
500	9.10	— .05	....	
400	9.00	— .10	....	
300	8.80	— .20	....	
200	8.54	— .26	....	
100	8.17	— .37	6.62	
100	7.20	+ .58	....	
200	7.73	.53	....	
300	8.24	.51	....	
400	8.55	.31	....	
500	9.00	.45	....	
600	9.34	.34	....	
670	9.40	.06	....	Tensile strength.
0	....	....	6.55	

Parted 1 strand at the pin.

No. 2372.

HEMP CABLE, SIZE $\frac{16}{64}$.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	1.55	....	....	
200	2.33	.78	1.00	Twisted line.
300	3.40	1.07	....	
400	4.31	.91	2.30	
500	5.20	.89	....	
600	5.92	.72	....	
500	5.85	—.07	....	
400	5.74	—.11	....	
300	5.57	—.17	....	
200	5.40	—.17	....	
100	5.05	—.35	3.80	
100	4.35	+.55	....	
200	4.75	.40	....	
300	5.11	.36	....	
400	5.40	.29	....	
500	5.71	.31	....	
600	6.05	.34	....	
700	6.50	.45	....	
800	6.93	.43	....	
842	7.15	.22	....	Tensile strength.

Parted 1 strand 24″ from the pin.

No. 2373.

ITALIAN LINE, $\frac{15}{64}$, 8-THREAD (HEMP).

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	2.30	....	....	
200	3.43	1.13	1.70	Twisted line.
300	4.40	.97	....	
400	5.20	.80	3.03	
500	5.84	.64	....	
600	6.43	.59	....	
500	6.33	—.10	....	
400	6.19	—.14	....	
300	6.00	—.19	....	
200	5.78	—.22	....	
100	5.40	—.38	4.12	
100	4.52	+.40	....	
200	5.00	.48	....	
300	5.47	.47	....	
400	5.88	.41	....	
500	6.15	.27	....	
600	6.45	.30	....	
700	6.84	.39	....	
800	7.24	.40	4.70	
840	7.50	.26	....	Tensile strength.
0	....	....	5.55	

Parted 3 strands 10″ from the pin.

No. 2389.

$\frac{7}{32}$ "Coy" Best Linen Gilling, No. 16, 3-Ply.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds	*Inches.*	*Inches.*	*Inches.*	
100	3.75	....	....	
200	5.24	1.49	3.32	Twisted line.
300	6.30	1.06	....	
200	6.05	—.25	....	
100	5.70	—.35	4.30	
100	5.37	+1.07	....	
200	5.90	.53	....	
300	6.45	.55	....	
400	6.95	.50	....	
428	7.15	.20	....	Tensile strength.
0	....	....	3.20	

Parted at the pin.

No. 2390.

$\frac{7}{32}$ "Coy" Best Linen Gilling, No. 25, 2-Ply.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.04	....	....	
200	4.27	1.23	2.40	Twisted line.
300	5.15	.88	....	
200	4.90	—.25	....	
100	4.54	—.36	3.14	
100	4.14	+1.00	....	
200	4.72	.58	....	
300	5.15	.43	....	
405	5.75	.60	....	Tensile strength.
0	....	....	.85	

Parted at the pin.

No. 2391.

$\frac{7}{32}$ "Coy" Best Linen Gilling, No. 30, 2-Ply.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.57	....	....	
200	4.85	1.28	3.00	Twisted line.
300	5.67	.82	....	
400	6.25	.58	....	Tensile strength.

Parted 1 strand 24″ from pin.

No. 2392.

Same Line as No. 2391.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.45			
200	4.85	1.40	2.86	
300	5.75	.90		
400	6.45	.70		
300	6.23	— .22		
200	6.00	— .23	4.15	
100	5.20	+1.05		
200	5.75	.55		
300	6.15	.40		
400	6.55	.40		
410	6.70	.15		Tensile strength.

Parted 24″ from pin.

No. 2393.

$\frac{7}{32}$ "Coy" Best Linen Gilling, No. 30, 3-Ply.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.55			
200	4.70	1.15	2.85	Twisted line.
300	5.46	.76		
400	6.05	.59		
300	6.00	— .05		
200	5.78	— .22		
100	5.40	— .38	4.00	
100	5.03	+1.03		
200	5.50	.47		
300	5.85	.35		
400	6.17	.32		
492	6.55	.38		Tensile strength.
0			1.55	

Parted at the pin.

No. 2394.

$\frac{7}{32}$ "Coy" Best Linen Gilling, No. 40, 2-Ply.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.85			
200	5.20	1.35	3.10	Twisted line.
300	6.05	.85		
200	5.80	— .25		
100	5.40	— .40	4.00	
100	5.10	+1.10		
200	5.55	.45		
300	6.05	.50		
400	6.58	.53		
425	6.70	.12		Tensile strength.
0			2.40	

Parted at the pin.

No. 2395.

$\frac{7}{32}$ BARBOUR'S LINEN SHOE-THREAD, 6-THREAD.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	4.05	....	....	
200	5.40	1.35	3.60	Twisted line.
300	6.12	.72	....	
400	6.80	.68	....	
300	6.58	− .22	....	
200	6.33	− .25	....	
100	6.03	− .30	4.72	
100	5.65	+ .93	....	
200	6.05	.40	....	
300	6.45	.40	....	
400	6.85	.40	....	
471	7.00	.15	....	Tensile strength.
0	....	....	3.70	

Parted at the pin.

No. 2396.

$\frac{7}{32}$ BARBOUR'S LINEN SHOE-THREAD, 9-STRAND.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	5.20	....	....	
200	6.73	1.53	4.63	Twisted line.
300	7.75	1.02	....	
400	8.72	.97	....	
300	8.50	− .22	....	
200	8.20	− .30	....	
100	7.80	− .40	6.33	
100	7.22	+ .89	....	
200	7.82	.60	....	
300	8.40	.58	....	
400	8.78	.38	....	
508	9.30	.52	....	Tensile strength.

Parted 12″ from the pin.

No. 2397.

$\frac{7}{32}$ BARBOUR'S LINEN SHOE-THREAD, 11-THREAD.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.15			
200	4.34	1.19	2.45	Twisted line.
300	5.12	.78		
400	5.95	.83		
300	5.70	− .25		
200	5.60	− .10		
100	5.24	− .36	4.10	
100	4.83	+ .73		
200	5.33	.50		
300	5.70	.37		
400	6.02	.32		
500	6.40	.38		
568	6.60	.20		Tensile strength.

Parted 36″ from pin.

No. 2398.

$\frac{7}{32}$ BARBOUR'S BEST GILLING THREAD.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.48			
200	4.71	1.23	3.05	Twisted line.
300	5.55	.84		
400	6.15	.60		
300	6.00	— .15		
200	5.78	— .22		
100	5.45	— .33	3.97	
100	5.03	+1.06		
200	5.50	.47		
300	5.85	.35		
400	6.24	.39		
500	6.52	.28		
582	6.90	.38		Tensile strength.
0			2.65	

Parted at pin.

No. 2399.

$\frac{7}{32}$ SMITH AND DOVE SAIL TWINE.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inch.*	*Inches.*	
100	2.53	....	....	
200	3.53	1.00	1.70	Twisted line.
300	4.20	.67	....	
400	4.70	.50	....	
300	4.60	— .10	....	
200	4.38	— .22	....	
100	4.10	— .28	2.75	
100	3.68	+ .93	....	
200	4.15	.47	....	
300	4.52	.37	....	
400	4.80	.28	....	
500	5.10	.30	....	
600	5.40	.30	....	
645	5.60	.20	....	Tensile strength.

Parted at middle.

No. 2400.

$\frac{7}{32}$ MARSHALL'S LINEN THREAD.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.90	....	....	
200	5.25	1.35	3.50	Twisted line.
300	6.00	.75	....	
400	6.70	.70	....	
300	6.57	— .13	....	
200	6.30	— .27	....	
100	6.00	— .30	4.72	
100	5.50	+ .78	....	
200	6.00	.50	....	
300	6.35	.35	....	
400	6.68	.33	....	
482	6.80	.12	....	Tensile strength.
0	....	....	1.50	

Parted at the pin.

No. 2401.

Best Italian Hemp, $\frac{7}{32}$.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	2.55	....	....	
200	3.70	1.15	1.87	Twisted line.
300	4.73	1.03	....	
400	5.42	.69	....	
300	5.25	− .17	....	
200	5.03	− .22	....	
100	4.62	− .41	3.35	
100	4.15	+ .80	....	
200	4.70	.55	....	
300	5.15	.45	....	
400	5.55	.40	....	
448	5.70	.15	....	Tensile strength.

Parted 24″ from pin.

No. 2402.

$\frac{7}{32}$ Best Russia Hemp.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.25	....	....	
200	4.80	1.55	2.90	Twisted line.
300	5.75	.95	....	
400	6.58	.83	....	
300	6.38	− .20	....	
200	6.15	− .23	....	
100	5.80	− .35	4.45	
100	5.40	+ .95	....	
200	5.95	.55	....	
300	6.28	.33	....	
400	6.65	.37	....	
500	7.10	.45	....	
600	7.52	.42	....	
670	7.80	.28	....	Tensile strength.
0	....	....	3.50	

Parted at the pin.

No. 2403.

No. 5 W. E. H. & Son Cotton.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	7.75	....	....	
200	11.35	3.60	7.35	Twisted line.
300	13.90	2.55	....	
200	13.52	—.38	....	
100	12.80	—.72	10.20	
100	12.05	+1.85	....	
200	13.12	1.07	....	
300	14.15	1.03	....	
388	15.50	1.35	....	Tensile strength.

Parted 12″ from pin.

No. 2404.

$\frac{3}{16}$ or No. 6 W. E. H. & Son Cotton.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	6.60	....	....	
200	10.00	3.40	5.00	Twisted line.
300	12.40	2.40	....	
400	14.20	1.80	....	
300	14.00	—.80	....	
200	13.50	—.50	....	
100	12.90	—.60	10.30	
100	11.85	+1.55	....	
200	12.80	.95	....	
300	13.57	.77	....	
390	14.00	.43	....	Tensile strength.

Parted 12″ from pin.

No. 2405.

¼ OR NO. 8 W. E. H. & SON COTTON.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	7.20	....	....	
200	10.20	3.00	4.90	
300	12.50	2.30	....	Twisted line.
400	14.55	2.05	....	
500	16.60	2.05	....	
600	17.15	.55	....	
500	17.10	— .05	....	
400	16.95	— .15	....	
300	16.55	— .40	....	
200	16.20	— .35	....	
100	15.40	— .80	12.50	
100	14.10	+1.60	....	
200	15.00	.90	....	
300	15.70	.70	....	
400	16.40	.70	....	
500	16.95	.55	....	
600	17.55	.60	....	
696	18.20	.65	....	Tensile strength.

Parted 24″ from pin.

No. 2374.

NO. 7 SHOT LINE.

“Coy” best linen gilling, No. 16, 3-ply (braided).

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.20	....	....	
200	5.90	2.70	3.05	Braided line.
300	7.54	1.64	....	
400	9.15	1.61	....	
300	9.03	— .12	....	
200	8.70	— .33	....	
100	8.00	— .70	5.60	
100	6.90	+1.30	....	
200	7.91	1.01	....	
300	8.70	.79	....	
400	9.60	.90	....	
447	9.80	.20	....	Tensile strength.
0	....	....	3.10	

Parted 3″ from pin.

No. 2375.

No. 7 Shot Line.

"Coy" best linen gilling, No. 25, 2-ply.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.70	....	....	
200	5.50	1.80	2.80	Braided line.
300	7.00	1.50	....	
400	8.15	1.15	....	
300	7.95	— .20	....	
200	7.55	— .40	....	
100	7.00	— .55	4.75	
100	5.85	+1.10	....	
200	6.75	.90	....	
300	7.55	.80	....	
400	8.34	.79	....	
500	9.35	1.01	....	
520	9.60	.25	....	Tensile strength.

Parted 24″ from pin.

No. 2376.

No. 7 Shot Line.

"Coy" best linen gilling, No. 30, 2-ply.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.12	....	....	
200	5.35	2.23	2.90	Braided line.
300	7.35	2.00	....	
400	8.96	1.61	....	
300	8.78	— .18	....	
200	8.43	— .35	....	
100	7.80	— .63	5.67	
100	6.70	+1.03	....	
200	7.70	1.00	....	
300	8.40	.70	....	
400	9.10	.70	....	
500	10.30	1.20	....	
510	10.35	.05	....	Tensile strength.

Parted 24″ from pin.

No. 2377.

NO. 7 SHOT LINE.

"Coy" best linen gilling, No. 30, 3-*ply.*

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	1.98	....	....	
200	4.83	2.85	2.75	Braided line.
300	6.78	1.95	....	
400	8.25	1.47	....	
300	8.15	— .10	....	
200	7.78	— .37	....	
100	7.15	— .63	5.12	
100	6.20	+1.08	....	
200	7.05	.85	....	
300	7.85	.80	....	
400	8.54	.69	....	
451	8.75	.21	....	Tensile strength.

Parted 36″ from the pin.

No. 2378.

NO. 7 SHOT LINE.

"Coy" best linen gilling, No. 40, 2-*ply.*

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	4.33	....	....	
200	7.20	2.87	4.70	Braided line.
300	9.85	2.65	....	
400	11.60	1.75	....	
300	11.47	— .13	....	
200	11.03	— .44	....	
100	10.40	— .63	7.98	
100	8.98	+1.00	....	
200	10.15	1.17	....	
300	11.03	.88	....	
400	12.00	.97	....	
468	12.70	.70	....	Tensile strength.
0	....	....	4.75	

Parted at the pin.

No. 2379.

No. 7 Shot Line.

Barbour's 6-cord linen shoe-thread, 57 cents per pound.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	2.95	....	....	
200	4.20	1.25	2.10	Braided line.
300	5.10	.90	....	
400	5.82	.72	....	
300	5.72	— .10	....	
200	5.42	— .30	....	
100	4.95	— .47	3.15	
100	4.05	+ .90	....	
200	4.83	.78	....	
300	5.40	.57	....	
400	6.00	.60	....	
500	6.45	.45	....	
567	6.90	.45	....	Tensile strength.

Parted 12″ from pin.

No. 2380.

No. 7 Shot Line.

Barbour's 9-cord linen shoe-thread, 95 cents.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	2.90	....	....	
200	6.80	3.90	4.51	Braided line.
300	8.75	1.95	....	
400	10.43	1.68	....	
300	10.27	— .16	....	
200	10.00	— .27	....	
100	9.50	— .50	7.75	
100	8.42	+ .67	....	
200	9.30	+ .88	....	
300	9.84	.54	....	
400	10.60	.76	....	
505	11.50	.90	....	Tensile strength.

Parted 24″ from pin.

No. 2381.

No. 7 Shot Line.

Barbour's 11-cord linen shoe-thread, 95 cents per pound.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	2.81	....	....	
200	4.10	1.29	2.03	Braided line.
300	5.20	1.10	....	
400	6.15	.95	....	
300	6.00	− .15	....	
200	5.55	− .45	....	
100	5.13	− .42	3.42	
100	4.31	+ .89	....	
200	5.05	.74	....	
300	5.75	.70	....	
400	6.25	.50	....	
495	....	....	....	Tensile strength.

Parted at the middle.

No. 2382.

No. 7 Shot Line.

Barbour's best gilling thread.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.30	....	....	
200	5.20	1.90	2.60	Braided line.
300	6.70	1.50	....	
400	8.00	1.30	....	
300	7.84	− .16	....	
200	7.35	− .49	....	
100	6.75	− .60	4.70	
100	5.65	+ .95	....	
200	6.60	.95	....	
300	7.45	.85	....	
400	8.15	.70	....	
500	9.20	1.05	....	
524	9.45	.25	....	Tensile strength.
0	....	....	2.15	

Parted at the pin.

No. 2383.

No. 7 Shot Line.

Smith & Dove No. 16 5-ply linen shoe-thread.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.20	....	....	
200	4.35	1.15	2.20	Braided line.
300	6.90	2.55	....	
400	8.25	1.35	....	
300	8.15	− .10	....	
200	7.80	− .35	....	
100	7.30	− .50	5.25	
100	6.30	+1.05	....	
200	7.15	.85	....	
300	7.80	.65	....	
400	8.45	.65	....	
500	9.40	.95	....	
524	9.60	.20	....	Tensile strength.
0	....	....	2.50	

Parted at the pin.

No. 2384.

No. 4 Shot Line.

Smith & Dove's best linen sail twine.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	1.35	....	....	
200	5.55	4.20	4.00	Braided line.
300	11.40	5.85	....	
200	11.15	− .25	....	
100	10.75	− .40	9.10	
100	9.70	+ .60	....	
200	10.65	.95	....	
300	11.60	.95	....	
368	13.00	1.40	....	Tensile strength.

Parted 24″ from the pin.

No. 2385.

No. 7 SHOT LINE.

No. 25 3-ply Marshall's linen thread.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches*	*Inches.*	
100	2.10	....	....	
200	5.15	3.05	2.70	
300	6.90	1.75	....	Braided line.
400	8.50	1.60	....	
300	8.34	− .16	....	
200	8.00	− .34	....	
100	7.40	− .60	5.43	
100	6.42	+ .99	....	
200	7.32	.90	....	
300	8.05	.73	....	
400	8.83	.78	....	
494	9.40	.57	....	Tensile strength.
0	....	....	3.00	

Parted at the pin.

No. 2386.

No. 7 SHOT LINE.

Italian hemp.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.20	....	....	
200	5.20	2.00	2.51	
300	6.80	1.60	....	Braided line.
400	8.33	1.53	....	
300	8.25	− .08	....	
200	7.94	− .31	....	
100	7.25	− .69	5.25	
100	6.25	+1.00	....	
200	7.15	.90	....	
300	7.90	.75	....	
400	8.70	.80	....	
476	9.00	.30	....	Tensile strength.

Parted 36″ from the pin.

No. 2387.

No. 7 SHOT LINE.

No. 12 3-*ply cotton yarn.*

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	6.40	....	....	
200	10.65	4.25	5.92	Braided line.
300	14.00	3.35	....	
200	13.80	— .20	....	
100	12.75	—1.05	8.40	
100	11.20	+2.80	....	
200	13.00	1.80	....	
300	14.55	1.55	....	
371	16.20	1.65	....	Tensile strength.
0	....	....	6.15	

Parted at the pin.

No. 2388.

¼″ RUSSIA HEMP.

[Twisted.]

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	2.50	....	....	
200	3.65	1.15	2.15	
300	4.40	.75	....	
400	5.00	.60	3.20	
500	5.50	.50	....	
600	5.90	.40	....	
500	5.82	— .08	....	
400	5.65	— .17	....	
300	5.50	— .15	....	
200	5.35	— .15	....	
100	5.00	— .35	4.20	
100	4.50	+ .30	....	
200	4.96	.46	....	
300	5.25	.29	....	
400	5.50	.25	....	
500	5.70	.20	....	
600	6.00	.30	....	
700	6.33	.33	....	
800	6.70	.37	....	Tensile strength.

Parted 2 strands 24″ from the pin.

SHOT-LINE TESTS.

TABLE NO. 3.—*TESTS OF WET LINES.*

No. of test.	Marks.	Line furnished by—	Kind.	Contraction in 6 feet, due to wetting.		Tensile strength.	Elongation in 6 feet.		Remarks.
				Inches.	Per cent.		Inches.	Per cent.	
						Pounds.			
2406	$\frac{1}{4}$″ Russia hemp	Silver Lake Company	Twisted	3.60	5.0	700	10.75	14.9	No. 7 shot line.
2413	Italian hemp	do	Braided	3.95	5.5	568	12.10	16.8	
2412	No. 25 3-ply Marshall's linen thread	do	do	3.75	5.2	484	12.90	17.9	
2414	Smith & Dove's best linen sail twine	do	do	2.95	4.1	410	13.00	18.1	
2416	Barbour's 6-cord linen shoe-thread, 57 cents per pound	do	do	4.95	6.9	664	12.20	16.9	
2417	Barbour's 9-cord linen shoe-thread, 95 cents	do	do	2.15	3.0	548	14.25	19.8	
2418	"Coy" best linen gilling, No. 25, 2-ply	do	do	3.10	4.3	552	13.00	18.1	
2419	"Coy" best linen gilling, No. 30, 2-ply	do	do	3.35	4.7	510	14.20	19.7	
2420	"Coy" best linen gilling, No. 16, 3-ply	do	do	3.10	4.3	478	13.00	18.1	
2415	No. 12 3-ply cotton yarn	do	do	3.35	4.7	410	23.50	32.6	
2421	$\frac{7}{32}$ best Italian hemp	M. F. Whiton & Co.	Twisted	8.65	12.0	592	14.00	19.4	
2423	$\frac{7}{32}$ best Russia hemp	do	do	8.10	11.3	390	13.70	19.0	
2428	do	do	do	8.80	12.2	592	17.10	23.8	
2422	$\frac{7}{32}$ Marshall's linen thread	do	do	8.60	11.9	573	17.10	23.8	
2424	$\frac{7}{32}$ Smith & Dove sail twine	do	do	10.62	14.7	779	14.00	19.4	
2425	$\frac{7}{32}$ Barbour's linen shoe-thread, 11-thread	do	do	10.40	14.4	710	16.65	23.1	
2426	$\frac{3}{16}$ or No. 6 W. E. H. & Son cotton	do	do	4.90	6.8	491	24.00	33.3	
2427	$\frac{1}{4}$ or No. 8 W. E. H. & Son cotton	do	do	3.80	5.3	778	24.00	33.3	
2407	Italian line, $\frac{15}{64}$, 8-thread	Sewall & Day	do	3.10	4.3	745	10.60	14.7	
2408	$\frac{16}{64}$ hemp cable	do	do	5.30	7.4	986	13.00	18.1	
2409	$\frac{16}{64}$ pure Manilla cable	do	do	5.50	7.6	796	14.25	19.8	
2410	$\frac{12}{64}$ pure Manilla	do	do	8.75	12.2	588	13.00	18.1	
2411	$\frac{15}{64}$ pure Manilla	do	do	6.65	9.2	930	15.60	21.6	

SHOT LINES.

DETAILS OF TESTS OF WET LINES.

[Contraction due to wetting measured on a length of 6 feet.]

No. 2406.

¼″ RUSSIA HEMP.

Contraction due to wetting, 3″.6 in 6 feet=5.0 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	5.60	....	....	
200	7.15	1.55	5.10	Twisted line.
300	8.15	1.00	....	
400	8.85	.70	6.50	
500	9.45	.60	....	
600	10.05	.60	....	
500	9.92	− .13	....	
400	9.85	− .07	....	
300	9.68	− .17	....	
200	9.40	− .28	....	
100	9.03	− .37	8.10	
100	8.80	+ .70	....	
200	9.25	.45	....	
300	9.60	.35	....	
400	9.90	.30	....	
500	10.25	.35	....	
600	10.50	.25	....	
700	10.75	.25	....	Tensile strength.

Parted 1 strand at the middle.

No. 2413.

NO. 7 SHOT LINE.

Italian hemp.

Contraction due to wetting, 3″.95=5.5 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.70	....	....	
200	6.38	2.68	3.80	Braided line.
300	8.62	2.24	....	
400	10.00	1.38	....	
300	9.80	− .20	....	
200	9.38	− .42	....	
100	8.58	− .80	6.95	
100	7.40	+ .45	....	
200	8.53	1.13	....	
300	9.68	1.15	....	
400	10.60	.92	....	
500	11.75	1.15	....	
568	12.10	.35	....	Tensile strength.

Parted 36″ from the pin.

No. 2412.

No. 7 SHOT LINE.

No. 25 3-ply Marshall's linen thread.

Contraction due to wetting, 3″.75 = 5.2 per cent.
Present diameter, ″.25.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	4. 00	....	....	
200	6. 85	2. 85	4. 45	Braided line.
300	8. 60	1. 75	....	
200	8. 40	— . 20	....	
100	7. 80	— . 60	6. 12	
100	6. 95	+ . 83	....	
200	8. 10	1. 15	....	
300	9. 20	1. 10	....	
340	10. 15	. 95	....	
400	11. 58	1. 43	....	
484	12. 90	1. 32	....	Tensile strength.

Parted 24″ from the pin.

No. 2414.

No. 7 SHOT LINE.

Smith & Dove's best linen sail twine.

Contraction due to 40 hours' wetting, 2″.95 = 4.1 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3. 38	....	....	
200	4. 85	1. 47	3. 38	Braided line.
300	6. 35	1. 50	....	
200	6. 05	— . 30	....	
100	5. 66	— . 39	4. 70	
100	5. 32	+ . 62	....	
200	6. 00	. 68	....	
300	7. 00	1. 00	....	
350	9. 60	2. 60	....	
360	11. 00	1. 40	....	
400	12. 80	1. 80	....	
410	13. 00	. 20	....	Tensile strength.

Parted 24″ from the pin.

No. 2416.

No. 7. Shot Line.

Barbour's 6-cord linen shoe-thread, 57 cents per pound.

Contraction due to 40 hours' wetting, 4″.95 = 6.9 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	4.05	....	....	
200	6.35	2.30	4.50	Braided line.
300	8.30	1.95	....	
400	9.73	1.43	....	
300	9.53	— .20	....	
200	9.10	— .43	....	
100	8.50	— .60	7.25	
100	7.33	+ .08	....	
200	8.33	1.00	....	
300	9.30	.97	....	
400	10.15	.85	....	
500	10.95	.80	....	
600	11.90	.95	....	
664	12.20	.30	....	Tensile strength.

Parted at the middle.

No. 2417.

No. 7 Shot Line.

Barbour's 9-cord linen shoe-thread, 95 cents.

Contraction due to 40 hours' wetting, 2″.15 = 3.0 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	4.60	....	....	
200	6.05	1.45	4.20	Braided line.
300	9.40	3.35	....	
400	12.15	2.75	....	
300	11.95	— .20	....	
200	11.50	— .45	....	
100	10.94	— .56	9.30	
100	9.40	+ .10	....	
200	10.75	1.35	....	
300	11.65	.90	....	
400	12.60	.95	....	
500	13.80	1.20	....	
548	14.25	.45	....	Tensile strength.

Parted at the middle.

No. 2418.

No. 7 Shot Line.

"Coy" best linen gilling, No. 25, 2-ply.

Contraction due to 40 hours' wetting, 3″.10 = 4.3 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.30	....	....	
200	6.40	3.10	4.15	Braided line.
300	8.90	2.50	5.70	
400	10.90	2.00	....	
300	10.58	— .32	....	
200	10.00	— .58	....	
100	9.10	— .90	7.40	
100	7.54	+ .14	....	
200	8.95	1.41	....	
300	9.95	1.00	....	
400	11.10	1.15	....	
500	12.30	1.20	....	
552	13.00	.70	....	
0	....	....	6.05	Tensile strength.

Parted at the pin.

No. 2419.

No. 7 Shot Line.

"Coy" best linen gilling, No. 30, 2-ply.

Contraction due to 40 hours' wetting, 3″.35 = 4.7 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	4.25	....	....	
200	6.65	2.40	4.30	Braided line.
300	8.10	1.45	....	
400	11.25	3.15	....	Load sustained 30 minutes, increasing elongation to 12″.97.
300	12.78	— .19	....	
200	12.43	— .35	....	
100	11.90	— .53	10.20	
100	10.50	+ .30	....	
200	11.55	1.05	....	
300	12.25	.70	....	
400	13.25	1.00	....	
510	14.20	.95	....	Tensile strength.

Parted 36″ from the pin.

No. 2420.

No. 7 SHOT LINE.

"Coy" best linen gilling, No. 16, 3-ply.

Contraction due to 40 hours' wetting, 3″.10 = 4.3 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	4.05	....	....	
200	6.70	2.65	4.10	Braided line.
300	8.40	1.70	....	
400	11.30	2.90	....	
300	11.00	— .30	....	
200	10.57	— .43	....	
100	9.70	— .87	7.78	
100	8.63	+ .85	....	
200	9.80	1.17	....	
300	10.80	1.00	....	
400	11.95	1.15	....	
478	13.00	1.05	....	Tensile strength.
0	....	....	6.00	

Parted at the pin.

No. 2415.

No. 7 SHOT LINE.

No. 12 3-ply cotton yarn.

Contraction due to 40 hours' wetting, 3″.35 = 4.7 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	10.90	....	....	Braided line.
150	13.90	3.00	6.40	
180	15.80	1.90	6.00	Immediate set was 7″.70, then continued slowly to recover to 6″.
200	16.60	.80	....	
300	20.05	3.45	....	
200	19.80	— .25	....	
100	18.25	—1.55	11.10	Immediate set.
200	18.50	+7.40	....	
300	20.40	1.90	....	
410	23.50	3.10	....	Tensile strength.

Parted 24″ from the pin.

No. 2421.

$\frac{7}{32}$ BEST ITALIAN HEMP.

Contraction due to 44 hours' wetting, 8″.65 = 12.0 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	9.70			
200	11.00	1.30	8.05	Twisted line.
300	12.00	1.00		
400	12.55	.55		
300	12.50	— .05		
200	12.20	— .30		
100	11.80	— .40	10.40	
100	11.58	+1.18		
200	12.15	1.43		
300	12.60	.45		
400	13.00	.40		
500	13.40	.40		
592	14.00	.60		Tensile strength.
0			9.40	

Parted at the pin.

No. 2423.

$\frac{7}{32}$ BEST RUSSIA HEMP.

Contraction due to 44 hours' wetting, 8″.10 = 11.3 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	8.50			
200	11.40	2.90	9.10	Twisted lines.
300	13.10	1.70		
390	13.70	.60		Tensile strength.

Parted 1 strand at the pin.

No. 2428.

$\frac{7}{32}$ BEST RUSSIA HEMP.

Contraction due to 20 hours' wetting, 8″.80 = 12.2 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	11.10		8.00	
200	13.70	2.60		Twisted line.
300	14.75	1.05		
400	15.70	1.05		
300	15.60	— .10		
200	15.40	— .20		
100	14.87	— .53	13.40	
100	14.23	+ .83		
200	14.95	.72		
300	15.63	.68		
400	16.20	.57		
500	16.70	.50		
592	17.10	.40		Tensile strength.

Parted 1 strand 6″ from the pin, then parted line at the middle.

No. 2422.

$\frac{7}{32}$ MARSHALL'S LINEN THREAD.

Contraction due to 44 hours' wetting, 8″.60 = 11.9 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	12.50	....	....	Twisted line.
200	14.00	1.50	9.75	Immediate set.
....	....	....	7.00	After 1 minute.
300	15.25	1.25	....	
400	15.80	.55	....	
300	15.75	— .05	....	
200	15.40	— .35	....	
100	15.05	— .35	13.45	
100	14.35	+ .90	....	
200	15.00	.65	....	
300	15.60	.60	....	
400	16.15	.55	....	
500	16.75	.60	....	
573	17.10	.35	....	Tensile strength.
0	....	....	11.00	

Parted 6″ from the pin.

No. 2424.

$\frac{7}{32}$ SMITH & DOVE SAIL TWINE.

Contraction due to 44 hours' wetting, 10″.62 = 14.7 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	9.15	....	....	
200	11.00	1.85	9.15	Twisted line.
300	11.70	.70	....	
400	12.35	.65	....	
300	12.25	— .10	....	
200	12.05	— .20	....	
100	11.80	— .25	10.95	
100	11.50	+ .55	....	
200	12.00	.50	....	
300	12.28	.28	....	
400	12.95	.67	....	
500	13.00	.05	....	
600	13.25	.25	....	
700	13.80	.55	....	
779	14.00	.20	....	Tensile strength.
0	....	....	10.00	

Parted at the pin.

No. 2425.

$\frac{7}{32}$ BARBOUR'S LINEN SHOE-THREAD, 11-THREAD.

Contraction due to 48 hours' wetting, 10″.40 = 14.4 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	11.30	....	....	
200	13.00	1.70	7.00	Twisted line.
300	14.00	1.00	....	
400	14.65	.65	....	
300	14.45	— .20	....	
200	14.22	— .23	....	
100	13.75	— .47	8.70	
100	12.25	+3.55	....	
200	13.35	1.10	....	
300	14.10	.75	....	
400	14.75	.65	....	
500	15.25	.50	....	
600	15.90	.65	....	
710	16.65	.75	....	Tensile strength.
0	....	....	10.90	

Parted at the pin.

No. 2426.

$\frac{3}{16}$ OR NO. 6 W. E. H. & SON COTTON.

Contraction due to 48 hours' wetting, 4″.90 = 6.8 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	14.30	....	7.00	
200	18.25	3.95	....	Twisted line.
300	20.25	2.00	....	
400	21.00	.75	....	
300	20.75	— .25	....	
200	20.10	— .65	....	
100	19.00	—1.10	13.20	
100	18.10	+4.90	....	
200	20.00	1.90	....	
300	21.00	1.00	....	
400	22.10	1.10	....	
491	24.00	1.90	....	Tensile strength.
0	....	....	13.20	

Parted at the pin.

No. 2427.

$\frac{1}{4}$ OR NO. 8 W. E. H. & SON COTTON.

Contraction due to 48 hours' wetting, 3″.80 = 5.3 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	10.25	....	....	Twisted line.
200	15.25	5.00	....	
300	17.50	2.25	....	
400	19.25	1.75	....	
500	20.50	1.25	....	
600	21.75	1.25	....	
700	23.00	1.25	....	
778	24.00	1.00	....	Tensile strength.

No. 2407.

ITALIAN LINE, $\frac{15}{64}$, 8-THREAD.

Contraction due to wetting, 3″.1=4.3 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	3.20	....	....	Twisted line.
200	5.20	2.00	3.10	
300	6.55	1.35	....	
400	7.50	.95	4.65	
500	8.50	1.00	....	
600	9.25	.75	....	
500	9.10	— .15	....	
400	8.90	— .20	....	
300	8.55	— .35	....	
200	8.05	— .50	....	
100	7.40	— .65	6.20	
100	6.50	+ .30	....	
200	7.30	.80	....	
300	8.05	.75	....	
400	8.60	.55	....	
500	9.20	.60	....	
600	9.70	.50	....	
700	10.20	.50	....	
745	10.60	.40	....	Tensile strength.

Parted 1 strand 24″ from the pin.

No. 2408.

$\frac{16}{64}$ HEMP CABLE.

Contraction due to wetting, 5″.30 = 7.4 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	5.00	....	....	
200	6.70	1.70	4.45	Twisted line.
300	7.65	.95	....	
400	8.30	.65	5.97	
500	9.10	.80	....	
600	10.25	1.15	....	
500	10.15	— .10	....	
400	10.00	— .15	....	
300	9.85	— .15	....	
200	9.50	— .35	....	
100	9.00	— .50	7.80	
100	8.50	+ .70	....	
200	9.05	.55	....	
300	9.60	.55	....	
400	9.95	.35	....	
500	10.30	.35	....	
600	10.80	.50	....	
700	11.35	.55	....	
800	12.00	.65	....	
900	12.80	.80	....	
986	13.00	.20	....	Tensile strength.

Parted 2 strands 36″ from the pin.

No. 2409.

$\frac{16}{64}$ PURE MANILLA CABLE.

Contraction due to wetting, 5″.5 = 7.6 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	5.75	....	....	
200	7.98	2.23	6.55	Twisted line.
300	9.05	1.07	....	
400	10.50	1.45	....	
300	10.35	− .15	....	
200	10.05	− .30	....	
100	9.64	− .41	8.25	
100	8.33	+ .08	....	
200	9.40	1.07	....	
300	10.20	.80	....	
400	10.80	.60	....	
500	12.00	1.20	....	
600	12.90	.90	....	
690	13.60	.70	....	
700	13.95	.35	....	
796	14.25	.30	....	Tensile strength.

Parted 1 strand 12″ from the pin.

No. 2410.

$\frac{12}{64}$ PURE MANILLA.

Contraction due to wetting, 8″.75 = 12.2 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	8.15	....	....	
200	10.10	1.95	5.40	Twisted line.
300	11.00	.90	....	
400	12.00	1.00	....	
300	11.78	− .22	....	
200	11.61	− .17	....	
100	11.11	− .50	9.28	
100	10.52	+1.24	....	
200	11.20	.68	....	
300	11.70	.50	....	
400	12.18	.48	....	
500	12.70	.52	....	
588	13.00	.30	....	Tensile strength.
0	....	....	11.05	

Parted 2 strands at the pin.

No. 2411.

$\frac{15}{64}$ PURE MANILLA.

Contraction due to wetting, 6″.65 = 9.2 per cent.
Present diameter ″.32.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	9.00	....	....	
200	11.15	2.15	8.15	
300	12.15	1.00	....	Twisted line.
400	13.00	.85	....	
500	13.65	.65	....	
600	14.15	.50	....	
500	14.05	− .10	....	
400	13.95	− .10	....	
300	13.76	− .19	....	
200	13.50	− .26	....	
100	13.07	− .43	11.00	
100	11.30	+ .30	....	
200	12.40	1.10	....	
300	13.10	.70	....	
400	13.60	.50	....	
500	14.05	.45	....	
600	14.50	.45	....	
700	14.80	.30	....	
800	15.12	.32	....	
900	15.50	.38	....	
930	15.60	.10	....	Tensile strength.

Parted 1 strand 8″ from the pin.

SHOT-LINE TESTS.

TABLE No. 4.—*LINES TESTED AFTER WETTING AND DRYING.*

No. of test.	Marks.	Line furnished by—	Kind.	Contraction from wetting and drying.				Tensile strength.	Elongation in 6 feet.	
				Wet.		Dried.				
				Inches.	*Per ct.*	*Inches.*	*Per ct.*	*Pounds.*	*Inches.*	*Per ct.*
2429	$\frac{7}{32}$ "Coy" best linen gilling, No. 40, 2-ply	M. F. Whiton & Co	Twisted	....	....	12.90	17.9	479	21.50	29.8
2431	$\frac{7}{32}$ "Coy" best linen gilling, No. 25, 2-ply	....do	....do	10.40	14.4	10.50	14.6	468	23.90	33.2
2432	$\frac{7}{32}$ "Coy" best linen gilling, No. 30, 3-ply	....do	....do	11.00	15.3	11.30	15.7	535	25.25	35.1
2430	$\frac{7}{32}$ Barbour's linen shoe-thread, 6-thread	....do	....do	....	....	7.65	10.6	545	19.75	27.4
2433	$\frac{7}{32}$ Barbour's best gilling thread	....do	....do	9.30	12.9	7.00	9.7	630	19.90	27.6
2434	No. 5 W. E. H. & Son cotton	....do	....do	6.30	8.8	4.90	6.8	428	29.00	40.3
2439	No. 7 shot line. Italian hemp	Silver Lake Company	Braided	3.45	4.8	2.25	3.1	560	13.10	18.2
2438	No. 7 shot line. Smith & Dove best linen sail twine	....do	....do	2.75	3.8	2.55	3.5	405	14.60	20.3
2440	No. 7 shot line. Coy best linen gilling, No. 16, 3-ply	....do	....do	3.40	4.7	2.35	3.3	480	13.40	18.6
2441	No. 7 shot line. Barbour's 9-cord linen shoe-thread	....do	....do	3.00	4.2	2.70	3.7	520	15.00	20.8
2442	No. 7 shot line. No. 12 3-ply cotton yarn	....do	....do	3.30	4.6	2.00	2.8	408	21.20	29.4
2443	$\frac{15}{64}$ pure manilla	Sewall & Day	Twisted	6.30	8.8	4.90	6.8	910	15.80	21.9
2444	$\frac{16}{64}$ pure manilla	....do	....do	5.25	7.3	3.90	5.4	740	16.00	22.2
2445	$\frac{15}{64}$ Italian line, 8-thread	....do	....do	3.70	5.1	2.90	4.0	890	11.50	15.9

SHOT LINES.

DETAILS OF LINES TESTED AFTER WETTING AND DRYING.

[Contraction due to wetting measured on a length of 6 feet.]

No. 2429.

$\frac{7}{32}$ "Coy" Best Linen Gilling, No. 40, 2-Ply.

Contraction due to wetting and drying, 12″.90 = 17.9 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	15.10	....	....	
100	17.80	2.70	....	Twisted line.
200	19.40	1.60	17.10	
300	20.55	1.15	....	
200	20.40	—.15	....	
100	19.95	—.45	18.30	
100	19.45	+1.15	....	
200	20.15	.70	....	
300	20.85	.70	....	
400	21.10	.25	....	
479	21.50	.40	....	Tensile strength.
0	....	....	16.40	

Parted at the pin.

No. 2431.

$\frac{7}{32}$ "Coy" Best Linen Gilling, No. 25, 2-Ply.

Contraction when wet . . . . 10″.40 = 14.4 per cent.
Contraction when dried . . . . 10″.50 = 14.6 per cent.

Additional contraction in drying 10

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	16.00	....	....	
100	19.75	3.75	....	Twisted line.
200	21.60	1.85	19.25	
300	22.90	1.30	....	
200	22.70	—.20	....	
100	22.15	—.55	20.25	
100	21.90	+1.65	....	
200	22.35	.45	....	
300	22.90	.55	....	
400	23.55	.65	....	
468	23.90	.35	....	Tensile strength.

Parted 36″ from the pin.

No. 2432.

$\frac{7}{32}$ "COY" BEST LINEN GILLING, NO. 30, 3-PLY.

Contraction when wet . . . . 11″.00=15.3 per cent.
Contraction when dried . . . . 11″.30=15.7 per cent.

Additional contraction in drying 30

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	16.50	....		
100	20.72	4.22	....	Twisted line.
200	22.60	1.82	20.25	
300	23.75	1.15	....	
400	24.50	.75	....	
300	24.30	—.20	....	
200	24.00	—.30	....	
100	23.55	—.45	21.90	
100	22.95	+1.05	....	
200	23.75	.80	....	
300	24.10	.35	....	
400	24.60	.50	....	
500	25.10	.50	....	
535	25.25	.15	....	Tensile strength.

Parted at the middle.

No. 2430.

$\frac{7}{32}$ BARBOUR'S LINEN SHOE-THREAD, 6-THREAD.

Contraction due to wetting and drying, 7″.65 = 10.6 per cent.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	12.25	....	....	
100	15.90	3.65	....	Twisted line.
200	17.40	1.50	15.30	
300	18.30	.90	....	
400	19.00	.70	....	
300	18.70	—.30	....	
200	18.45	—.25	....	
100	18.00	—.45	16.60	
100	17.80	+1.20	....	
200	18.30	.50	....	
300	18.75	.45	....	
400	19.00	.25	....	
500	19.50	.50	....	
545	19.75	.25	....	Tensile strength.

Parted 8″ from the pin.

No. 2433.

$\frac{7}{32}$ BARBOUR'S BEST GILLING THREAD.

Contraction when wet . . . . 9″.30=12.9 per cent.
Contraction when dried . . . . 7″.00= 9.7 per cent.

Restoration . . . . 2″.30

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	11.70	....	....	
100	15.40	3.70	....	Twisted line.
200	17.00	1.60	14.60	
300	18.10	1.10	....	
400	18.60	.50	....	
300	18.45	—.15	....	
200	18.20	—.25	....	
100	17.80	—.40	16.30	
100	17.30	+1.00	....	
200	18.00	.70	....	
300	18.50	.50	....	
400	18.90	.40	....	
500	19.10	.20	....	
600	19.40	.30	....	
630	19.90	.50	....	Tensile strength.

Parted 24″ from the pin.

No. 2434.

No. 5 W. E. H. & SON COTTON.

Contraction when wet . . . . 6″.30=8.8 per cent.
Contraction when dried . . . . 4″.90=6.8 per cent.

Restoration . . . . 1″.40

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	13.10	....	....	
100	19.90	6.80	14.50	Twisted line.
200	23.80	3.90	....	
300	26.60	2.80	....	
200	26.25	—.35	....	
100	25.15	—1.10	21.00	
100	24.00	+3.00	....	
200	25.60	1.60	....	
300	26.80	1.20	....	
400	28.60	1.80	....	
428	29.00	.40	....	Tensile strength.

Parted 24″ from the pin.

No. 2439.

No. 7 Shot Line.

Italian hemp.

Contraction when wet . . . . 3″.45=4.8 per cent.
Contraction when dried . . . . 2″.25=3.1 per cent.

Restoration . . . . 1″.20

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	3.15			
100	6.25	3.10		Braided line.
200	8.30	2.05	5.60	
300	10.12	1.82		
400	11.35	1.23		
300	11.15	— .20		
200	10.70	— .45		
100	10.17	— .53	8.05	
100	9.12	+1.07		
200	10.05	.93		
300	10.75	.70		
400	11.53	.78		
500	12.40	.87		
560	13.10	.70		Tensile strength.

Parted 24″ from the pin.

No. 2438.

No. 7 Shot Line.

Smith & Dove best linen sail twine.

Contraction when wet . . . . 2″.75=3.8 per cent.
Contraction when dried . . . . 2″.55=3.5 per cent.

Restoration . . . . ″.20

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	1.00			
100	2.05	1.05		Braided line.
200	8.90	6.85	7.15	
280	12.10	3.20		
300	12.75	.65		
200	12.55	— .20		
100	12.13	— .42	10.32	
100	11.40	+1.08		
200	12.21	.81		
300	13.12	.91		
405	14.60	1.48		Tensile strength.
0			7.80	

Parted 8″ from the pin.

No. 2440.

No. 7 SHOT LINE.

"Coy" best linen gilling, No. 16, 3-ply.

Contraction when wet	3″.40=4.7 per cent.
Contraction when dried	2″.35=3.3 per cent.
Restoration	1″.05

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	3.20	....	....	
100	6.00	2.70	....	Braided line.
200	8.45	2.45	5.55	
300	11.00	2.55	....	
400	12.43	1.43	....	
300	12.21	—.22	....	
200	11.75	—.46	....	
100	11.20	—.55	8.65	
100	9.94	+1.29	....	
200	11.03	1.09	....	
300	11.90	.87	....	
400	12.68	.78	....	
480	13.40	.72	....	
0	....	....	5.80	Tensile strength.

Parted at the pin.

No. 2441.

No. 7 SHOT LINE.

Barbour's 9-cord linen shoe-thread, 95 cents.

Contraction when wet	3″.00=4.2 per cent.
Contraction when dried	2″.70=3.7 per cent.
Restoration	″.30

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	3.00	....	....	
100	5.15	2.15	....	Braided line.
200	10.40	5.25	7.50	
300	12.00	1.60	....	
400	13.64	1.64	....	
300	13.48	—.16	....	
200	13.12	—.36	....	
100	12.60	—.52	10.40	
100	11.60	+1.20	....	
200	12.53	.93	....	
300	13.15	.62	....	
400	13.95	.80	....	
500	14.80	.85	....	
520	15.00	.20	....	
0	....	....	7.80	Tensile strength.

Parted 8″ from the pin.

No. 2442.

NO. 7 SHOT LINE.

No. 12, 3-ply, cotton yarn.

Contraction when wet . . . . 3″.30=4.6 per cent.
Contraction when dried . . . . 2″.00=2.8 per cent.

Restoration . . . . 1″.30

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	4.30	....	....	
100	10.15	5.85	5.50	Braided line.
200	14.75	4.60	....	
300	18.25	3.50	....	
200	17.75	—.50	....	
100	16.70	—1.05	11.50	
100	14.90	+3.40	....	
200	17.00	2.10	....	
300	18.75	1.75	....	
400	21.00	2.25	....	
408	21.20	.20	....	Tensile strength.

Parted at the middle.

No. 2443.

$\frac{15}{64}$ PURE MANILLA.

Contraction when wet . . . . 6″.30=8.8 per cent.
Contraction when dried . . . . 4″.90=6.8 per cent.

Restoration . . . . 1″.40

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	6.00	....	....	
100	8.85	2.85	....	Twisted line.
200	11.10	2.25	8.60	
300	12.30	1.20	....	
400	13.30	1.00	10.90	
500	14.10	.80	....	
600	14.60	.50	....	
500	14.50	—.10	....	
400	14.35	—.15	....	
300	14.15	—.20	....	
200	13.90	—.25	....	
100	13.15	—.75	12.40	
100	12.85	+.45	....	
200	13.40	.55	....	
300	13.90	.50	....	
400	14.10	.20	....	
500	14.40	.30	....	
600	14.75	.35	....	
700	15.00	.25	....	
800	15.40	.40	....	
900	15.75	.35	....	
910	15.80	.05	....	Tensile strength.
0	....	....	13.50	

Parted 2 strands at the pin.

No. 2444.

$\frac{16}{64}$ PURE MANILLA CABLE.

Contraction when wet	5″.25=7.3 per cent.
Contraction when dried	3″.90=5.1 per cent.
Restoration	1″.35

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	4.70	....	....	
100	6.75	2.05	....	
200	9.90	3.15	8.00	
300	12.10	2.20	....	
400	13.40	1.30	11.05	
500	14.25	.85	....	
600	15.00	.75	....	
500	14.94	—.06	....	
400	14.75	—.19	....	
300	14.55	—.20	....	
200	14.30	—.25	....	
100	13.95	—.35	12.10	
100	13.15	+1.05	....	
200	13.60	.45	....	
300	14.00	.40	....	
400	14.40	.40	....	
500	14.80	.40	....	
600	15.10	.30	....	
700	15.55	.45	....	
740	16.00	.45	....	Tensile strength.

Parted 1 strand 24″ from the pin.

No. 2445.

$\frac{15}{64}$ ITALIAN LINE, 8-THREAD.

Contraction when wet . . . . 3″.70 = 5.1 per cent.
Contraction when dried . . . . 2″.90 = 4.0 per cent.

Restoration . . . . ″.80

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
20	3.40	....	....	
100	6.05	2.65	....	Twisted line.
200	7.65	1.60	6.00	
300	8.80	1.15	....	
400	9.65	.85	7.15	
500	10.10	.45	....	
600	10.55	.45	....	
500	10.47	— .08	....	
400	10.32	— .15	....	
300	10.15	— .17	....	
200	9.92	— .23	....	
100	9.50	— .42	8.15	
100	8.64	+ .49	....	
200	9.17	.53	....	
300	9.60	.43	....	
400	9.90	.30	....	
500	10.30	.40	....	
600	10.70	.40	....	
700	11.00	.30	....	
800	11.35	.35	....	
890	11.50	.15	....	Tensile strength.

Parted 3 strands 5″ from pin.

SHOT LINES SUBJECTED TO REPEATED STRESSES AND OTHER KINDS OF TREATMENT.

No. 2435.

No. 7 Shot Line.

Barbour's best gilling thread.

[From Silver Lake Company.]

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	2.80	....	....	Braided line.
200	4.85	2.05	....	
300	6.60	1.75	....	
400	7.80	1.20	....	
400	8.15	.35	....	After 2 minutes.
400	8.30	.15	....	After 4 minutes.
400	8.30	0.	....	After 6 minutes.
200	7.60	—.70	....	
200	7.65	.05	....	After 2 minutes.
400	8.35	.70	....	
200	7.70	—.65	....	
400	8.35	.65	....	
200	7.80	—.55	....	
400	8.45	.65	....	
200	7.80	—.65	....	
400	8.40	.60	....	
100	7.20	—1.20	....	
400	8.55	1.35	....	
100	7.20	—1.35	....	
0	....	....	5.40	
100	5.90	+.50	....	
200	6.90	1.00	....	
300	7.70	.80	....	
400	8.50	.80	....	
100	7.12	.62	....	
400	8.50	1.38	....	
400	8.55	.05	....	After 2 minutes.
Now began to wet the line.				
400	8.75	.20	....	4 minutes after wetting began.
400	8.90	.15	....	11 minutes after wetting began.
400	8.95	.05	....	19 minutes after wetting began.
500	9.30	.35	....	
574	10.00	.70	....	Tensile strength.

Parted 36″ from pin.

No. 2436.

$\frac{12}{64}$ PURE MANILLA.

[From Sewall & Day Cordage Company.]

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	2.00	....	....	Twisted line.
200	4.00	2.00	....	
300	4.80	.80	....	
400	5.45	.65	....	
400	5.83	.38	....	After 4 minutes.
400	5.87	.04	....	After 6 minutes.
400	5.90	.03	....	After 9 minutes.
400	5.97	.07	....	After 12 minutes.
	Now began to wet the line.			
400	5.97	0.	....	3 minutes after wetting began.
400	6.03	.06	....	8 minutes after wetting began.
400	6.13	.10	....	19 minutes after wetting began.
0	....	....	3.15	
0	....	....	2.10	After 32 minutes.
100	3.55	1.45	....	
200	4.65	1.10	....	
300	5.30	.65	....	
400	5.82	.52	....	
500	6.20	.38	....	
610	6.50	.30	....	Tensile strength.

Parted 2 strands 6″ from pin in dry section of the line.

No. 2437.

$\frac{7}{32}$ BARBOUR'S BEST GILLING THREAD.

[From M. F. Whiton & Co.]

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
100	4.50	....	....	Twisted line.
200	5.57	1.07	....	
300	6.25	.08	....	
400	6.87	.62	....	
400	7.03	.16	....	After 2 minutes.
400	7.03	0.	....	After 4 minutes.
200	6.68	—.35	....	
200	6.70	.02	....	After 3 minutes.
400	7.06	.36	....	
	7.06	0.	....	After 2 minutes.
	Now began to wet the line.			
400	7.12	.06	....	2 minutes after wetting began.
400	7.20	.08	....	7 minutes after wetting began.
400	7.25	.05	....	16 minutes after wetting began.
400	7.34	.09	....	40 minutes after wetting began.
400	7.40	.06	....	52 minutes after wetting began.
400	7.40	0.	....	69 minutes after wetting began.
200	7.05	— .35	....	
400	7.40	+ .35	....	
0	....	....	4.98	
200	6.52	1.54	....	
300	6.97	.45	....	
400	7.21	.24	....	
0	....	....	5.14	
400	7.24	2.10	....	
500	7.50	.26	....	Tensile strength.

Parted 24″ from pin.

PURE MANILLA CABLE, SIZE $\frac{16}{64}''$.

[From Sewall, Day & Co.]

This piece of twisted line had been wet and dried and once tested by tension in the testing machine.

Now tested by suspending a 15-inch shot with the line, the total weight suspended being 465 pounds.

A clove hitch and two half hitches was used at either end around $1\frac{3}{4}''$ bolts, leaving 5 feet of the line under stress.

The gauged-length marks were 1 foot from each end.

Time.	Condition of line.	Load.	Gauged length.	Remarks.
		Pounds	*Inches.*	
10^{h} 05^{m} a. m.	Dry	0	36.00	
10^{h} 12^{m} a. m.	do	465	41.90	
10^{h} 20^{m} a. m.	do	465	42.00	
10^{h} 28^{m} a. m.	do	465	42.00	
10^{h} 30^{m} a. m.				Began to wet the line.
10^{h} 33^{m} a. m.	Wet	465	42.00	
10^{h} 38^{m} a. m.	do	465	41.95	
2^{h} 00^{m} p. m.	do	465	42.00	
Kept wet till 5 p. m., then dried over night with the load still on.				
8^{h} 15^{m} a. m.	Dry surface	465	42.60	
10^{h} 08^{m} a. m.	Wet	465	42.57	
10^{h} 13^{m} a. m.	do			Load released and rope gradually shortened.
10^{h} 18^{m} a. m.	do	0	40.95	
10^{h} 19^{m} a. m.	do	465	42.20	
10^{h} 20^{m} a. m.	do	465	42.30	
10^{h} 26^{m} a. m.	do	465	42.35	
10^{h} 54^{m} a. m.	do	465	42.35	
11^{h} 20^{m} a. m.	do	465	42.35	
Load on over night.				
8^{h} 45^{m} a. m.	Dry	465	42.80	
2^{h} 50^{m} p. m.	Wet	465	42.60	
Load released. After 2 hours' rest unloaded, the rope allowed to dry somewhat and also shrink in the mean time. It was reloaded.				
4^{h} 50^{m} p. m.	Partly dry	465	42.10	
Load sustained over night.				
8^{h} 10^{m} a. m.	Dry	465	42.88	
5^{h} 00^{m} p. m.	do	465	42.90	
Load sustained over night.				
8^{h} 15^{m} a. m.	Dry	465	43.05	
1^{h} 50^{m} p. m.	do	465	43.10	
5^{h} 00^{m} p. m.	do	465	43.10	
Rope parted some time between Saturday, September 22 p. m., and Monday, September 24 a. m.				

Parted 3 strands 24″ from the 465 pounds weight, and also parted one of these strands at another place 36″ up the rope nearer the upper end, but $2\frac{1}{2}$ feet from hook at upper end.

Time under stress, 3 days 8 hours to 5 days 22 hours.

ITALIAN LINE, $\frac{15}{64}$, 8-THREAD.

[From Sewall & Day.]

Suspended 465 pounds. Weight as before.

Time.	Condition of line.	Load.	Gauged length.	Remarks.
		Pounds.	*Inches.*	
8h 50m a. m.	Dry	0	36.00	Twisted line.
8h 51m a. m.	...do	465	....	
8h 55m a. m.	...do	465	41.15	
9h 20m a. m.	...do	465	41.28	
11h 55m a. m.	...do	465	41.40	
5h 00m p. m.	...do	465	41.50	
8h 00m a. m.	...do	465	....	Found 1 strand parted.

Strand parted some time during the night 24″ from end fastening. Time under stress, 9 to 23 hours.

NO. 5 W. E. H. & SON COTTON.

[From M. F. Whiton & Co.]

245 pounds. Weight suspended as before.

Time.	Condition of line.	Load.	Gauged length.	Remarks.
		Pounds.	*Inches.*	
9h 20m a. m.	Dry	0	36.00	Twisted line.
9h 30m a. m.	...do	245	44.65	
1h 55m p. m.	...do	245	44.95	
5h 00m p. m.	...do	245	45.05	
Sustained load over night.				
8h 45m a. m.	Dry	245	45.05	
11h 55m a. m.	...do	245	45.05	
5h 00m p. m.	...do	245	45.05	
8h 15m a. m.	...do	245	45.10	
5h 00m p. m.	...do	245	45.05	
8h 45m a. m.	...do	245	45.10	
5h 00m p. m.	...do	245	45.15	
8h 00m a. m.	...do	245	....	Line found parted.

Parted at lower fastening consisting of clove hitch around clevis 1¾″ diameter. Length after fracture, 41″.

Line upset and kinked after parting. Total time under stress, 3 days and 8 to 23 hours.

ITALIAN LINE, $\frac{15}{64}$, 8-THREAD.

[From Sewall & Day.]

A gauged length of 3 feet was laid off on the dry rope, the rope was then wetted, after which the 465 pounds weight was suspended as before.

Time.	Condition of line.	Load.	Gauged length.	Remarks.
		Pounds.	*Inches.*	
$8^h 40^m$ a. m.	Dry	0	36.00	Twisted line.
$8^h 45^m$ a. m.	Wet	0		
$8^h 50^m$ a. m.	...do	465	41.40	
$1^h 50^m$ p. m.	...do	465	41.50	
$5^h 00^m$ p. m.	...do	465	41.40	
Load sustained over night.				
$8^h 45^m$ a. m.	Dry	465	42.00	
$8^h 50^m$ a. m.				Wetted.
$11^h 50^m$ a. m.	Wet	465	41.90	
$5^h 00^m$ p. m.	...do	465	41.85	
$8^h 15^m$ a. m.	Dry	465	42.10	
$8^h 18^m$ a. m.				Line again wetted.
$5^h 00^m$ p. m.	Wet	465	42.05	
$8^h 30^m$ a. m.	Dry	465	42.15	
Line again wetted.				
$5^h 00^m$ p. m.	Wet	465	42.10	
$8^h 00^m$ a. m.	Dry	465	42.30	
Strands distorted, some riding others. Snapping sounds occurred. Weight sustained 2 days.				
$8^h 00^m$ a. m.	Dry	465	42.50	
$5^h 00^m$ p. m.	...do	465	42.50	
$11^h 40^m$ a. m.	...do	465		Line parted.

Parted 1 strand at hitch at lower end; 1 strand parted 6″ from same hitch.

Time under stress, 7 days 3 hours.

SHOT LINES.

TESTS OF STRANDS, CORDS, AND THREADS.

STRANDS, CORDS, AND THREADS.

[From lines furnished by M. F. Whiton & Co.]

Marks.	Tensile strength (pounds).				Remarks
	Strands.		Cords each.	Threads each.	
	Each.	Aggregate.			
$\frac{7}{32}$ best Russia hemp	276 202 290	768	......	29 30 15 95	 Thread untwisted Thread hard twisted.
$\frac{4}{32}$ best Russia hemp	78 105 90	273	......	21 13	Untwisted.
$\frac{7}{32}$ Barbour's best gilling thread.	208 206 194	608	......	24 18 21½ 22½ 20	3-ply threads.
Do	187 205 191	583	......	......	
Barbour's best gilling thread, $\frac{4}{32}$.	84 80 79	243	......	......	
Barbour's linen shoe-thread, $\frac{7}{32}$, 6-thread.	...... 196 191 194	581	40 43½ 41 37 44	8½ 4½ 5 9 8½ 9	1-ply threads.
Barbour's linen shoe-thread, $\frac{4}{32}$, 6-thread.	92 100 106	298	......	......	
Barbour's linen shoe-thread, 9-strand.	...... 204 210 200	614	55 46 53 52 44 42	6½ 4½ 5½ 5 9½ 4	
Do	95 94 108	297	......	......	
Barbour's linen shoe-thread, $\frac{7}{32}$, 11-thread.	...... 218 208 216	642	...... 51 53 52 52	3 5½ 4 6½ 4½	
Barbour's linen shoe-thread, $\frac{7}{32}$, 11-thread.	166 172 198*	....	....	....	Dried in muffle.
Do	194 308 202	....	....	....	 Saturated with water. Saturated with sperm-oil.
Barbour's linen shoe-thread, 11-ply, $\frac{4}{32}$.	98 101 89	288	......	......	
$\frac{7}{32}$ "Coy" best linen gilling, No. 16, 3-ply.	164 162 163	489	......	14½ 18 17 17 19	
$\frac{4}{32}$ "Coy" best linen gilling, No. 16, 3-ply.	77 66 77	220	......	16 18 16	
$\frac{7}{32}$ "Coy" best linen gilling, No. 25, 2-ply.	...... 158 176 150	484	......	8 8½ 8½ 8½ 8	

* Dampened by passing through steam.

TESTS OF STRANDS, CORDS, AND THREADS—Continued.

Marks.	Tensile strength (pounds).				Remarks.
	Strands.			Threads each.	
	Each	Aggregate.	Cords each.		
$\frac{7}{32}$ "Coy" best linen gilling, No. 25, 2-ply.	145	....	....	....	Dry strand.
	240	....	....	....	Wet strand.
	242	....	....	....	Do.
Do........................	138	....	....	....	Hard twisted.
	148	....	....	....	Loose twisted.
	247	....	....	....	Wet.
$\frac{4}{32}$ "Coy" best linen gilling, No. 25, 2-ply.	......	274	....	9	
	89			8	
	92			7	
	93			9½	
	......			8½	
Do........................	83	....	....	....	Dry strand.
	108	....	....	....	Wet strand.
	126	....	....	....	Do.
$\frac{7}{32}$ "Coy" best linen gilling, No. 30, 2-ply.	152	468	....	7½	
	158			7	
	158			8½	
	......			6½	
	......			8	
Do........................	145	....	....	....	
	128	....	....	....	Dried in muffle.
	150*	....	....	....	
Do........................	160	....	....	....	
	266	....	....	....	Saturated with water.
	150	....	....	....	Saturated with sperm-oil.
$\frac{4}{32}$ "Coy" best linen gilling, No. 30, 2-ply.	89	282	....	8½	
	100			6½	
	93			6½	
	......			7	
$\frac{7}{32}$ "Coy" best linen gilling, No. 30, 3-ply.	172	555	....	....	
	195				
	188				
$\frac{4}{32}$ "Coy" best linen gilling, No. 30, 3-ply.	......	273	....	11½	
	93			11	
	87			12	
	93			14½	
	......			12½	
$\frac{7}{32}$ "Coy" best linen gilling, No. 40, 2-ply.	......	510	....	6½	
	171			6	
	167			6½	
	172			7	
	......			5½	
$\frac{4}{32}$ "Coy" best linen gilling, No. 40, 2-ply.	86	237	....	....	
	75				
	76				
$\frac{7}{32}$ Smith & Dove sail twine ..	265	796	....	....	
	248				
	283				
Do........................	......	742	....	27	2-ply threads.
	252			38	
	250			45	
	240			39	
	......			38	
Smith & Dove sail twine $\frac{4}{32}$ ..	173	459	....	40	2-ply threads.
	138			34	
	148			41	
	......			35	
	......			44	
$\frac{7}{32}$ Marshall's linen thread ...	181	557	....	19½	3-ply threads.
	194			16	
	182			15½	
	......			13½	
	......			16½	
Do........................	175	....	....	....	Dry strand.
	208	....	....	....	Wet strand.
	208	....	....	....	Do.
$\frac{4}{32}$ Marshall's linen thread ...	96	287	....	16	
	100			17	
	91			15½	
	......			13	
	......			12½	

* Dampened by passing through steam.

TESTS OF STRANDS, CORDS, AND THREADS—Continued.

Marks.	Tensile strength (pounds).				Remarks.
	Strands.		Cords each.	Threads each.	
	Each.	Aggregate.			
$_{2}$ Marshall's linen thread	102				Dry strand.
	127				Wet strand.
	126				Do.
$\frac{7}{32}$ best Italian hemp	218	709			
	281				
	210				
$\frac{4}{32}$ best Italian hemp	71	235			
	60				
	104				
Do	84	225			Strands from other end of line.
	70				
	71				
Do	232				Tests of entire line for verification.
	242				
Do	50				
	88				Saturated with water.
	106				Do.
No. 5 W. E. H. & Son cotton.	......	425		3	
	149			1½	
	123			4½	
	153			3½	
	......			4½	
$\frac{3}{16}$ or No. 6 W. E. H. & Son cotton.	158	502			
	175				
	169				
$\frac{1}{4}$ or No. 8 W. E. H. & Son cotton.	271	807			
	272				
	263				
No. 4½ W. E. H. & Son cotton.	99	267			
	95				
	73				
Do	97				Dry strand.
	81				Wet strand.
	104				Do.

STRANDS AND THREADS.

[From lines furnished by Sewall & Day Cordage Company.]

Marks.	Tensile strength (pounds).			Remarks.
	Strands.		Threads each.	
	Each.	Aggregate.		
$\frac{15}{64}$ pure manilla	299 320 364	983	....	
$\frac{16}{64}$ pure manilla cable	237 235 205 194	871	89 75 98	
$\frac{12}{64}$ pure manilla	304 305 303	912	115 116	Thread untwisted. Do.
$\frac{16}{64}$ hemp cable	284 278 220 220	1,002	110 97 85	
$\frac{15}{64}$ Italian line, 8-thread	315 248 302 254	1,119	....	
$\frac{3}{16}$ hemp rope	134 138 127	399	76 40 62 77	
Do.	120 180 128	....	....	Saturated with water. Do.

[Line from Silver Lake Company.]

$\frac{1}{4}$'' Russia hemp	190 236 255 210	891	....	

SHOT LINES.

MEASUREMENTS OF STRANDS AND THREADS FROM SECTIONS OF LINES WHICH WERE 12 INCHES LONG BEFORE UNLAYING.

[From lines furnished by the Silver Lake Company.]

Marks.	Lay of rope, one turn in.	Lengths, when unlayed.			Remarks.
		Strands.		Threads.	
		Inches.			
No. 7 shot line, "Coy" best linen gilling, No. 25, 2-ply.	Braided...	17.80	18.70		
		17.60	17.00		
		18.40	18.00		
		19.40	17.70		
		18.60	19.10		
		17.00	18.80		
No. 7 shot line, "Coy" best linen gilling, No. 30, 2-ply.	Braided...	(Core	12.40)		
		18.80	19.10		
		19.25	19.45		
		18 40	19.25		
		19.40	19.30		
		19.75	19.20		
		19.10	19.40		
No. 7 shot line, "Coy" best linen gilling, No. 30, 3-ply.	Braided...	19.30	19.10		
		19.10	18.55		
		19.30	18.05		
		18.35	19.30		
		18.85	18.50		
		18.75	18.20		
No. 7 shot line, "Coy" best linen gilling, No. 30, 3-ply.	Braided...	(Core	12.25)		
		19.75	19.30		
		19.25	19.10		
		19.60	19.35		
		19.20	19.85		
		19.20	19.95		
		19.35	19.80		
No. 7 shot line, Barbour's 6-cord linen shoe-thread, 57 cents per pound.	Braided...	17.50	17.40		
		17.45	17.25		
		17.35	17.30		
		17.45	17.20		
		17.25	17.70		
		16.90	17.45		
No. 7 shot line, Barbour's 11-cord linen shoe-thread, 95 cents per pound.	Braided...	16.85	17.00		
		16.70	17.25		
		17.00	16.80		
		16.60	17.10		
		16.50	16.15		
		16.50	16.20		
No. 7 shot line, Barbour's best gilling thread.	Braided...	17.90	18.50		
		17.90	19.20		
		18.90	18.60		
		18.25	18.80		
		18.70	18.40		
		18.50	18.50		
No. 7 shot line, Smith & Dove No. 16, 5-ply linen shoe-thread.	Braided...	18.45	18.10		
		18.40	18.30		
		18.30	18.00		
		18.40	18.40		
		18.65	18.30		
		18.30	18.65		
¼″ Russia hemp	″.75	(Core	12.55)		
		15.25	14.50		
		15.50	14.75		

[From lines furnished by M. F. Whiton & Co.]

$\frac{7}{32}$ best Italian hemp	″.60	13″.70 each		15″.20 to 15″.60 each.	
$\frac{7}{32}$ Barbour's linen shoe-thread, 11-thread.	″.75	13″.30 13″.35	13″.35	14″.50 to 14″.60 each.	
$\frac{7}{32}$ Smith & Dove sail twine	″.87	13″.30 13″.25	13″.40	14″.10 to 14″.15	
$\frac{7}{32}$ Marshall's linen thread	″.62	14″.10 14″.10	14″.10	14″.80 each	
$\frac{3}{16}$ or No. 6 W. E. H. & Son cotton.	″.56	14″.80 14″.80	14″.60	16″.80 each	
¼ or No. 8 W. E. H. & Son cotton.	″.62	15″.40 15″.40	15″.45	17″.00 to 17″.30 each.	
$\frac{12}{64}$ pure manilla	″.67	13″.80 13″.80	13″.90	14″.40 each	Line from Sewall & Day.

SAMPLES OF OLD BRAIDED LINEN UNBLEACHED WATER-PROOF SHOT LINES NOS. 4 AND 7, MANUFACTURED BY THE SILVER LAKE COMPANY.

These lines were placed at the Ludington Life-Saving Station, Lake Michigan, in 1880.

The No. 4 line has been fired twice.

The No. 7 line has never been fired.

The lines were secured to the testing machine by passing both ends around grooved pins.

TESTS OF SHOT LINE NO. 4.

Total length, 302½ feet.
Diameter, ″.14.
Total weight, 2 pounds 7 ounces.
Weight per 100 fathoms, 4 pounds 13.5 ounces.
Braided line of 9 strands, 4 threads per strand.
Core of 4 threads.

No. 2564.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
50	1.60	....	....	
100	6.20	4.60	....	
150	8.50	2.30	....	
200	10.20	1.70	....	
221	11.10	.90	....	Tensile strength.

Parted 24″ from the pin.

No. 2565.

50	4.70	....	....	
100	8.15	3.45	....	
150	10.25	2.10	....	
191	11.20	.95	....	Tensile strength.

Parted 12″ from the pin.

No. 2566.

50	3.45	....	....	
100	7.65	4.20	....	
150	9.85	2.20	....	
200	11.30	1.45	....	Tensile strength.

Parted 24″ from the pin.

No. 2567.

50	3.10	....	....	
100	7.75	4.65	....	
150	10.00	2.25	....	
100	9.80	—.20	....	
50	9.40	—.40	7.25	
50	8.50	+1.25	....	
100	9.50	1.00	....	
150	10.40	.90	....	
200	11.75	1.35	....	
214	12.00	.25	....	Tensile strength.

Parted 24″ from the pin.

No. 2568.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
50	3.25			
100	7.25	4.00		
150	9.40	2.15		
100	9.20	— .20		
50	8.75	— .45	6.70	
50	7.85	+1.15		
100	8.75	.90		
150	9.75	1.00		
200	11.00	1.25		Tensile strength.

Parted 24″ from the pin.

No. 2569.

50	4.10			
100	7.50	3.40		
150	9.60	2.10		
100	9.35	— .25		
50	8.90	— .45	7.00	
50	8.10	+1.10		
100	8.95	.85		
150	9.85	.90		
200	11.00	1.15		
206	11.10	.10		Tensile strength.

Parted 24″ from the pin.

Test of No. 4 Shot Line.

No. 2577.

[After soaking in water 24 hours.]

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
50	7.40			
100	10.15	2.75	7.45	
150	12.20	2.05		
200	13.85	1.65		
230	14.85	1.00	11.30	
238	15.50	.65		Tensile strength.

Parted 24″ from the pin.

No. 2579.

[After soaking in water 24 hours, and then drying 60 hours.]

50	6.95			
100	9.25	2.30		
150	11.25	2.00	8.40	
174	12.10	.85		Tensile strength.

Parted 24″ from the pin.

TESTS OF SHOT LINE NO. 7.

Total length, 304 feet.
Diameter, ″.22.
Total weight, 5 pounds 10½ ounces.
Weight per 100 fathoms, 11 pounds 2.6 ounces.
Braided line of 12 strands, 7 threads per strand.
Core of 7 threads.

No. 2570.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
50	1.50	....	....	
100	2.00	.50	....	
200	5.20	3.20	....	
300	7.10	1.90	....	
400	8.90	1.80	....	
438	....	....	....	Tensile strength.

Parted 24″ from the pin.

No. 2571.

50	.55	....	....	
100	2.05	1.50	....	
200	5.20	3.15	....	
300	7.20	2.00	....	
400	8.60	1.40	....	
445	9.30	.70	....	Tensile strength.

Parted at the pin.

No. 2572.

50	1.12	....	....	
100	1.75	.63	....	
200	4.95	3.20	....	
300	7.00	2.05	....	
400	8.35	1.35	....	
442	9.00	.65	....	Tensile strength.

Parted 24″ from the pin.

No. 2573.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
50	1.35	....	....	
100	1.90	.55	....	
200	5.20	3.30	....	
300	7.10	1.90	....	
400	8.50	1.40	....	
300	8.40	— .10	....	
200	8.17	— .23	....	
100	7.70	— .47	....	
50	7.20	— .50	5.70	
50	5.90	+ .20	....	
100	6.40	.50	....	
200	7.40	1.00	....	
300	8.15	.75	....	
400	9.00	.85	....	
430	9.20	.20	....	Tensile strength.

Parted 24″ from the pin.

No. 2574.

50	1.50	....	....	
100	2.10	.60	....	
200	5.40	3.30	....	
300	7.50	2.10	....	
400	9.15	1.65	....	Tensile strength.

Parted 12″ from the pin.

No. 2575.

50	1.30	....	....	
100	2.10	.80	....	
200	5.40	3.30	....	
300	7.35	1.95	....	
400	9.10	1.75	....	Tensile strength.

Parted 36″ from the pin.

No. 2576.

50	1.50	....	....	
100	2.00	.50	....	
200	5.40	3.40	....	
300	7.40	2.00	....	
200	7.10	— .30	....	
100	6.70	— .40	....	
50	6.35	— .35	4.50	
50	5.00	+ .50	....	
100	5.70	.70	....	
200	6.72	1.02	....	
300	7.60	.82	....	
400	9.00	1.40	....	
448	9.90	.90	....	Tensile strength.

Parted 12″ from the pin.

No. 2578.

TEST OF NO. 7 SHOT LINE.

[After soaking in water 24 hours.]

Contraction in 6 feet, { 4″.75 first section.
4″.85 second section.

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
50	3.10	....	....	
100	5.80	2.70	....	
200	8.00	2.20	....	
300	9.85	1.85	7.15	
300	10.40	3.25	....	
350	11.50	1.10	....	
400	12.50	1.00	....	
450	13.50	1.00	....	
483	13.65	.15	....	Tensile strength.
0	....	....	7.30	

Parted at the pin.

No. 2580.

NO. 7 SHOT LINE.

[After soaking in water 24 hours and then drying 60 hours.]

Applied loads.	Elongation in 6 feet.		Permanent set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inches.*	*Inches.*	
50	2.45	....	....	
100	4.67	2.22	....	
200	7.85	3.18	5.50	
300	9.20	1.35	....	
400	11.10	1.90	....	
438	11.30	.20	....	Tensile strength.

Parted 12″ from the pin.

TESTS OF KNOTS AND HITCHES WITH SHOT LINE No. 7.

Ends made fast to grooved pins the same as in previous tests of the lines.

The knots and bends used to fasten the two lengths of line together were placed midway between the pins.

The pieces of line used were from fractured ends of previous tests.

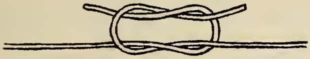
This line is coated with beeswax, and very slippery.

Description of knot at middle.	Tensile strength.	Parted.
	Pounds.	
Square knot	258	At knot.
Do	251	Do.
Do	288	Do.
Do	255	Do.
Square knot, ends stopped back	360	Do.
Bread bag, or Miller's knot	137	Knot unrolled.
Do	115	Do.
Bread bag, ends knotted	252	At knot.
Do	267	Do.
Bread bag, ends stopped back	328	Do.
Do	297	Do.
Granney knot	74	Knot unrolled.
Do	88	Do.
Granney knot, ends stopped back	322	At knot.
Do	372	Do.
Single carrick bend	272	Do.
Do	270	Do.
Do	340	Do.
Do	389	Do.
Weaver's knot	272	Do.
Do	250	Do.
Double carrick bend	250	Do.
Do	268	Do.
Do	345	Do.
Do	315	Do.
Two bowlines	348	
Do	324	
Do.	349	
Do	250	1″ from knot. Rope thought to have been weakened by earlier tests.
Do	334	
Overhand knot	250	At the knot.
Do	240	Do.
Figure eight, or German knot	300	Do.
Do	264	Do.
Sheepshank	289	At the bight.
Do	268	Knot unrolled.
Do	260	Do.
Rolling hitch *	240	At the hitch.
Do*	244	Do.
Rolling hitch on 3″ tarred rope	400	Do.
Do	350	Do.

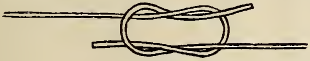
* The standing part was chalked to prevent slipping.

Knots and H

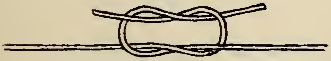
Square knot



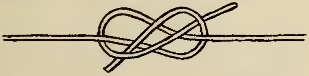
Bread bag, or Millers knot



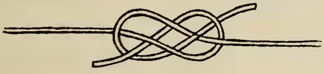
Granney knot



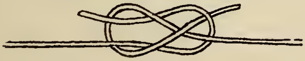
Single Carrick bend.



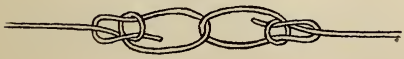
Double Carrick bend

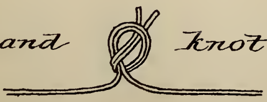


Weavers knot



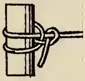
Bowlines



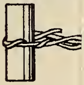
Overhand  knot

F

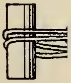
Clove hitch
and
half hitch



Timbe
hitch



Bowlin
on the b



H Ex. 1.4

TESTS OF KNOTS AND HITCHES WITH SHOT LINE No. 7.

Ends made fast to grooved pins the same as in previous tests of the lines.

The knots and bends used to fasten the two lengths of line together were placed midway between the pins.

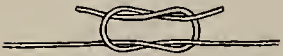
The pieces of line used were from fractured ends of previous tests.

This line is coated with beeswax, and very slippery.

Description of knot at middle.	Tensile strength.	Parted.
	Pounds.	
Square knot	258	At knot.
Do	251	Do.
Do	288	Do.
Do	255	Do.
Square knot, ends stopped back	360	Do.
Bread bag, or Miller's knot	137	Knot unrolled.
Do	115	Do.
Bread bag, ends knotted	252	At knot.
Do	267	Do.
Bread bag, ends stopped back	328	Do.
Do	297	Do.
Granney knot	74	Knot unrolled.
Do	88	Do.
Granney knot, ends stopped back	322	At knot.
Do	372	Do.
Single carrick bend	272	Do.
Do	270	Do.
Do	340	Do.
Do	389	Do.
Weaver's knot	272	Do.
Do	250	Do.
Double carrick bend	250	Do.
Do	268	Do.
Do	345	Do.
Do	315	Do.
Two bowlines	348	
Do	324	
Do.	349	
Do	250	1″ from knot. Rope thought to have been weakened by earlier tests.
Do	334	
Overhand knot	250	At the knot.
Do	240	Do.
Figure eight, or German knot	300	Do.
Do	264	Do.
Sheepshank	289	At the bight.
Do	268	Knot unrolled.
Do	260	Do.
Rolling hitch *	240	At the hitch.
Do*	244	Do.
Rolling hitch on 3″ tarred rope	400	Do.
Do	350	Do.

* The standing part was chalked to prevent slipping.

Knots and Hitches



Square knot

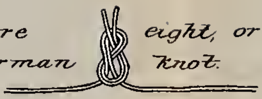
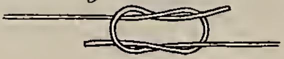
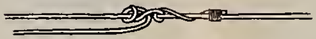


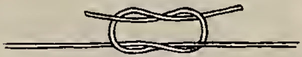
Figure eight, or German knot.



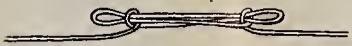
Bread bag, or Millers knot



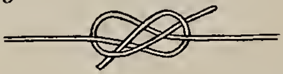
Rolling hitch



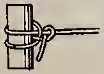
Granney knot



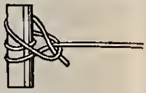
Sheepshank



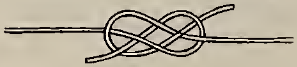
Single Carrick bend.



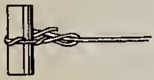
Clove hitch and half hitch



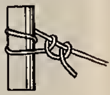
Clove hitch with extra round turn



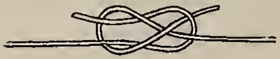
Double Carrick bend



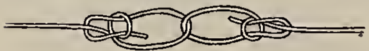
Timber hitch



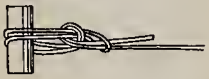
Round turn and two half hitches



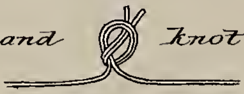
Weavers knot



Bowlines

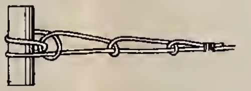


Bowline on the bight



Overhand knot

H Ex. 14 51 1



Anchor knot

SHOT LINES.

[Manufactured by M. F. Whiton & Co., Boston, Mass., from Smith and Dove's sail twine.]

Size of lines, No. 7.
Weight of coils, 18¼ pounds. Diameter of line, ″.2.
Lines composed of 3 strands of 8 threads each.
Lay one turn in ″.7.
Length of line between pins, about 4 feet.

No. of test.	Location of sample in coil.	Tensile strength.	Fractured.
		Pounds.	
2661	Outside end	615	At pin.
	Inside end	612	One strand at pin, one 6″ away.
2663	Outside end	574	At middle.
2664	....do	568	At pin.
2665	....do	548	6″ from pin.
2667	....do	658	At middle.
	Inside end	567	At pin.
2669	Outside end	551	3″ from pin.
2670	....do	569	12″ from pin.
2671	....do	575	8″ from pin.
2672	....do	573	At middle.
2673	Outside end	510	6″ from pin.
	200 feet from outside end	710	
	225 feet from outside end	538	At long splice.
	400 feet from outside end	667	
	600 feet from outside end	566	
	800 feet from outside end	685	
	1,000 feet from outside end	558	
	1,200 feet from outside end	602	
	1,400 feet from outside end	687	
	1,600 feet from outside end	694	
	Inside end	676	
2674	Outside end	510	1 foot from pin.
2675	....do	594	Do.
2676	....do	550	At the pin.
	200 feet from outside end	597	
	230 feet from outside end	466	At long splice.
	400 feet from outside end	686	
	600 feet from outside end	640	
	800 feet from outside end	689	
	1, 000 feet from outside end	548	
	1, 200 feet from outside end	596	
	1, 400 feet from outside end	705	
	1, 600 feet from outside end	606	
	Inside end	596	
2677	Outside end	660	3″ fron pin.
	Inside end	656	1 foot from pin.
2679	Outside end	564	At pin.
2680	....do	520	At middle.
2681	....do	580	3″ from pin.
2682	....do	577	At pin.
2683	....do	612	At middle.
2684	....do	586	At pin.
2685	....do	625	1 foot from pin.
	Inside end	810	6 feet from pin.
2687	Outside end	574	At pin.
2688	....do	615	Do.
2689	....do	569	1 foot from pin.
2690	....do	590	At pin.
2691	....do	508	6″ from pin.
	200 feet from outside end	612	
	225 feet from outside end	402	At long splice.
	400 feet from outside end	645	
	600 feet from outside end	602	
	800 feet from outside end	650	
	1, 000 feet from outside end	635	
	1, 200 feet from outside end	663	
	1, 400 feet from outside end	664	
	1, 600 feet from outside end	647	
	Inside end	618	
2692	Outside end	600	5″ from pin.
2693	....do	569	At pin.
2694	....do	546	1 foot from pin.
2695	....do	535	At pin.
2696	....do	584	1 foot from pin.

SHOT LINES—Continued.

No. of test.	Location of sample in coil.	Tensile strength.	Fractured.
		Pounds.	
2697	Outside end	559	At pin.
2698	....do	570	6″ from pin.
2699	....do	564	1 foot from pin.
2700	....do	546	6″ from pin.
2701	....do	510	At middle.
2702	....do	560	At pin.
2703	....do	578	6″ from pin.
2704	....do	571	At middle.
2705	....do	558	6″ from pin.
2706	....do	626	At pin.
	Inside end	665	Do.
2708	Outside end	691	1 foot from pin.
	Inside end	658	6″ from pin.
2710	Outside end	563	At pin.
2711	....do	620	Do.
2712	....do	577	1 foot from pin.
2713	....do	650	3″ from pin.
	Inside end	750	At pin.
2715	Outside end	582	Do.
2716	....do	505	Do.
2717	....do	586	6″ from pin.
2718	....do	600	1 foot from pin.
2719	....do	630	Do.
	Inside end	705	6″ from pin.
2721	Outside end	697	10″ from pin.
	Inside end	645	1 foot from pin.
2723	Outside end	545	At pin.
2724	....do	598	At middle.
2725	....do	568	1 foot from pin.
2726	....do	574	At middle.
2727	....do	597	1 foot from pin.
2728	....do	607	Do.
2729	....do	618	6″ from pin.
2730	....do	575	1 foot from pin.
2731	....do	559	At pin.
2732	....do	588	6″ from pin.
2733	....do	606	At middle.
2734	....do	573	10″ from pin.
2735	....do	651	At middle.
	Inside end	630	At pin.
2737	Outside end	551	6″ from pin.
2738	....do	581	Do.
2739	....do	655	At pin.
	Inside end	599	Do.
2740	Outside end	597	6″ from pin.
2741	....do	574	1 foot from pin.
2742	....do	570	At pin.
2743	....do	554	6″ from pin.
2744	....do	584	10″ from pin.
2745	....do	593	1 foot from pin.
2746	....do	678	Do.
	200 feet from outside end	686	At pin.
	400 feet from outside end	740	At middle.
	600 feet from outside end	810	At pin.
	800 feet from outside end	798	1 foot from pin.
	900 feet from outside end	553	At long splice.
	1,000 feet from outside end	815	At pin.
	1,200 feet from outside end	773	6″ from pin.
	1,400 feet from outside end	752	At pin.
	Inside end	697	6″ from pin.

Line No. 2673 contained a second long splice about 700 feet from end, a third splice 980 feet from end, a fourth splice 1,220 feet from end, and a fifth splice about 1,500 feet from end.

Line No. 2676 contained a second splice 650 feet from end, a third splice 975 feet from end, and a fourth long splice 1,220 feet from end.

Line No. 2691 contained a second long splice 475 feet from end, a third splice 725 feet from end, a fourth splice 970 feet from end, a fifth splice 1,275 feet from end, and a sixth splice 1,460 feet from end.

BRAIDED SHOT LINES.

[Made of Smith and Dove's 2-ply sail twine. Lines furnished by Silver Lake Company.]

No. 2888.

FIRST COIL.

Total length, 588 feet.
Weight, 15 pounds 4 ounces = 15.56 pounds per 100 fathoms.
Composed of 12 strands of 4 threads each.
Sample from inside end of coil.
Elongations measured in 6 feet.

Applied loads.	Elongation.	Remarks.
Pounds.	*Inches.*	
50	.80	
100	2.20	
200	4.10	
300	5.40	
400	6.70	
500	7.50	
600	8.00	
700	8.70	
		Load released and slack taken up.
700	9.10	
794	9.55	Tensile strength.

Parted 3″ from the pin.

FIRST COIL.

Location of sample in coil.	Tensile strength.	Fractured.
	Pounds.	
Outside end	572	12″ from pin.
Do	779	At pin.
100 feet from outside end	778	Do.
200 feet from outside end	764	Do.
300 feet from outside end	791	Do.
400 feet from outside end	758	Do.
500 feet from outside end	778	Do.
Inside end	794	3″ from pin.

No. 2889.

SECOND COIL.

Total length, 559 feet.
Weight, 14 pounds 7½ ounces = 15.53 pounds per 100 fathoms.
Diameter, ″.27.

Location of sample in coil.	Tensile strength.	Fractured.
	Pounds.	
Outside end	758	At the pin.
100 feet from outside end	783	Do.
200 feet from outside end	781	Do.
300 feet from outside end	780	Do.
400 feet from outside end	776	Do.
Inside end	780	Do.

No. 2890.

THIRD COIL.

Total length, 591 feet.
Weight, 15 pounds 7 ounces = 15.67 pounds per 100 fathoms.
Diameter, ″.27.

Location of sample in coil.	Tensile strength.	Fractured.
	Pounds.	
Outside end	746	At the pin.
100 feet from outside end	748	Do.
200 feet from outside end	766	Do.
300 feet from outside end	766	Do.
500 feet from outside end	775	Do.
Inside end	759	Do.

No. 2891.

FOURTH COIL.

Total length, 609 feet.
Weight, 5 pounds 15½ ounces = 5.88 pounds per 100 fathoms.
Diameter, ″.17.
Composed of 9 strands of 2 threads each.

Location of sample in coil.	Tensile strength.	Fractured.
	Pounds.	
Outside end	316	6″ from the pin.
100 feet from outside end	298	At the pin.
200 feet from outside end	312	Do.
300 feet from outside end	305	At the middle.
400 feet from outside end	319	3″ from the pin.
500 feet from outside end	307	12″ from the pin.
Inside end	326	12″ from the pin.

No. 2892.

FIFTH COIL.

Total length, 609 feet.
Weight, 6 pounds = 5.91 pounds per 100 fathoms.
Diameter, ″.16.

Location of sample in coil.	Tensile strength.	Fractured.
	Pounds.	
Outside end	324	At the pin.
100 feet from outside end	334	At the middle.
200 feet from outside end	322	At the pin.
300 feet from outside end	325	At the middle.
400 feet from outside end	310	At the pin.
500 feet from outside end	316	6″ from the pin.
Inside end	312	At the pin.

No. 2893.

SIXTH COIL.

Total length, 627 feet.
Weight, 6 pounds 2 ounces = 5.86 pounds per 100 fathoms.
Diameter, ″.16.

Location of sample in coil.	Tensile strength.	Fractured.
	Pounds.	
Outside end	302	At the pin.
100 feet from outside end	315	Do.
200 feet from outside end	328	At the middle.
300 feet from outside end	320	At the pin.
400 feet from outside end	316	At the middle.
500 feet from outside end	300	At the pin.
Inside end	236	3″ from the pin.

Tensile tests of Smith & Dove's two-ply sail twine:

34 pounds
32 pounds
34 pounds
29 pounds
37 pounds
38 pounds
} = 34 pounds mean tensile strength.

ADHESION OF SPIKES AND BOLTS
IN
RAILROAD TIES.

TIE NO. 1.

New cedar tie, been cut about 8 months. In wet condition.

No. 2113.

Round bolt, ″.52 diameter, driven in bored hole ″.455 diameter.
Length driven in wood, 4½″.
Surface in wood, 7.353 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
620	84	....	Maximum resistance.
560	....	⅛	
505	....	¼	
480	....	⅜	
460	....	½	
440	....	⅝	
405	....	¾	
370	....	⅞	
350	....	1	
350	....	1⅛	
340	....	1¼	
340	....	1⅜	
320	....	1½	
300	....	1⅝	
270	....	1¾	
250	....	1⅞	
230	....	2	
190	....	2½	
150	....	3	

TIE NO. 1.

No. 2114.

5½″ railroad spike, ″.625 × ″.650, driven without boring.
Length driven in wood, 5″.
Surface in wood, 12.75 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1,130	89	....	Maximum resistance.
1,080	....	⅛	
950	....	¼	
860	....	⅜	
760	....	½	
655	....	¾	
630	....	1	
590	....	1¼	
550	....	1½	
440	....	1¾	
340	....	2	

TIE NO. 1.

No. 2115.

Round bolt ″.645 diameter, driven in bored hole ″.455 diameter.
Length driven in wood, 4″.40.
Surface in wood 8.914 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1, 095	123	....	Maximum resistance.
934	....	⅛	Load released, and bolt rested 1 hour.
920	....	⅛	Starts again.
815	....	¼	
775	....	⅜	
765	....	½	
755	....	¾	
710	....	1	
605	....	1½	Throbs.
545	....	1¾	
500	....	2	
415	....	2¼	
330	....	2½	

TIE NO. 1.

No. 2116.

Round bolt ″.645 diameter, driven in bored hole ″.520 diameter.
Length driven in wood 4″.2.
Surface in wood 8.509 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1, 262	148	....	Maximum resistance.
1, 060	....	⅛	
1, 030	....	¼	
1, 010	....	⅜	
990	....	½	
920	....	¾	
858	....	1	
782	....	1¼	
745	....	1½	
670	....	1¾	
575	....	2	
500	....	2¼	
426	....	2½	

TIE NO. 1.

No. 2117.

Round bolt ″.770 diameter, driven in bored hole ″.690 diameter.
Length driven in wood, 5″.
Surface in wood, 12.095 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1,840	152	....	Maximum resistance.
1,695	....	1/8	
1,520	....	1/4	
1,390	....	3/8	
1,280	....	1/2	
1,085	....	3/4	
950	....	1	
825	....	1 1/4	
778	....	1 1/2	
732	....	1 3/4	
676	....	2	
605	....	2 1/4	
555	....	2 1/2	

TIE NO. 1.

No. 2118.

Round bolt ″.750 diameter, driven in bored hole ″.690 diameter.
Length driven in wood, 4″.8.
Surface in wood, 11.309 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1,610	142	....	Maximum resistance.
1,394	....	1/8	
1,185	....	1/4	
1,110	....	3/8	
1,065	....	1/2	
982	....	3/4	
930	....	1	
908	....	1 1/4	
842	....	1 1/2	
785	....	1 3/4	
720	....	2	
645	....	2 1/4	
598	....	2 1/2	

TIE NO. 1.

No. 2119.

Round bolt ″.750 diameter, driven in bored hole ″.690 diameter.
Hole lubricated with black oil.
Length driven in wood, 4″.8.
Surface in wood, 11.309 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
650	57	....	Maximum resistance.
460	....	⅛	
388	....	¼	
338	....	⅜	
300	....	½	
254	....	¾	
220	....	1	
188	....	1¼	
180	....	1½	
180	....	1¾	
172	....	2	
136	....	2¼	
128	....	2½	

TIE NO. 2.

New cedar tie; been cut about 8 months; wet; sound wood.

No. 2120.

Round bolt ″.760 diameter, driven in bored hole ″.690 diameter.
Length driven in wood, 4″.8.
Surface in wood, 11.461 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1,808	158	....	Maximum resistance.
1,510	....	⅛	
1,380	....	¼	
1,242	....	⅜	
1,175	....	½	
1,100	....	⅝	
1,055	....	¾	
935	....	1	
795	....	1¼	
695	....	1½	
625	....	1¾	
588	....	2	
520	....	2¼	
468	....	2½	

TIE NO. 2.

No. 2121.

Round bolt ″.760 diameter, driven in bored hole ″.645 diameter.
Length driven in wood, 4″.
Surface in wood, 9.550 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1,626	170	....	Maximum resistance.
1,280	....	⅛	
1,190	....	¼	
1,098	....	⅜	
1,060	....	½	
968	....	¾	
860	....	1	
755	....	1¼	
700	....	1½	
620	....	1¾	
555	....	2	
450	....	2¼	
350	....	2½	

TIE NO. 2.

No. 2122.

Round bolt ″.750 diameter, driven in bored hole ″.645 diameter.
Length driven in wood, 4″.1.
Surface in wood, 9.660 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1,300	135	....	Maximum resistance.
1,120	....	⅛	Load released and rested 20 minutes.
1,005	....	¼	
970	....	⅜	
912	....	½	
855	....	¾	
800	....	1	
735	....	1¼	
684	....	1½	
610	....	1¾	
574	....	2	
490	....	2¼	
405	....	2½	

TIE No. 2.

No. 2123.

Round bolt ″.654 diameter, driven in bored hole ″.455 diameter.

Bolt was driven 44 hours before test was commenced; has rough, rusty surface.

Length driven in wood, 4″.3.

Surface in wood, 8.836 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1,834	208	....	Maximum resistance.
1,525	....	⅛	
1,355	....	¼	
1,230	....	⅜	
1,154	....	½	
995	....	¾	
940	....	1	
850	....	1¼	
770	....	1½	
705	....	1¾	
650	....	2	
553	....	2¼	
454	....	2½	

TIE No. 2.

No. 2124.

Round bolt ″.645 diameter, driven in ship-auger-bored hole ″.565 diameter.

Length driven in wood, 4″.60.

Surface in wood, 9.320 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
948	102	....	Maximum resistance.
780	....	⅛	
725	....	¼	
682	....	⅜	
650	....	½	
598	....	¾	
530	....	1	
478	....	1¼	
450	....	1½	
422	....	1¾	
430	....	2	
392	....	2¼	
380	....	2½	
372	....	2¾	
318	....	3	

TIE NO. 2.

No. 2125.

Round bolt, ″.654 diameter; same bolt as No. 2123; newly driven in bored hole, ″.455 diameter.

Length driven in wood, 4″.35.

Surface in wood, 8.93 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1,308	14	....	Maximum resistance.
1,032	....	⅛	
940	....	¼	
870	....	⅜	
808	....	½	
720	....	¾	
676	....	1	
655	....	1¼	
648	....	1½	
600	....	1¾	
555	....	2	
515	....	2¼	
470	....	2½	

TIE NO. 2.

No. 2126.

Round bolt ″.654 diameter, driven in bored hole ″.455 diameter. Surface of bolt painted with asphalt varnish.

Length driven in wood, 4″.5.

Surface in wood, 9.248 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
530	57	....	Maximum resistance.
395	....	⅛	
392	....	¼	
330	....	⅜	
335	....	½	
380	....	¾	
378	....	1	
352	....	1¼	
310	....	1½	
300	....	1¾	
292	....	2	
266	....	2¼	
230	....	2½	

TIE NO. 2.

No. 2127.

Round bolt ″.650 diameter, driven in bored hole ″.455 diameter. Surface of bolt covered with mastic and white zinc.

Length driven in wood, 4″.5.

Surface in wood, 9.189 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
390	42	....	Maximum resistance.
285	....	⅛	
230	....	¼	
225	....	⅜	
214	....	½	
222	....	¾	
192	....	1	
194	....	1¼	
160	....	1½	
144	....	1¾	
140	....	2	
130	....	2¼	
115	....	2½	

TIE NO. 2.

No. 2128.

Round bolt ″.635 diameter, driven in bored hole ″.455 diameter. Bolt driven in hole filled with water. Tested immediately thereafter.

Length driven in wood, 4″.20.

Surface in wood, 8.379 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
1,045	125	....	Maximum resistance.
928	....	⅛	
905	....	¼	
864	....	⅜	
836	....	½	
784	....	¾	
742	....	1	
670	....	1¼	
Rested under 200 pounds pull 1 hour; 692 pounds resistance after resting.			
576	....	1½	
465	....	1¾	
320	....	2	
295	....	2¼	
260	....	2½	

TIE No. 2.

No. 2143.

Round bolt ″.765 diameter, with chisel point, driven in bored hole ″.565 diameter.

Length driven in wood, 5″.

Surface in wood, 12.015 square inches.

Driven into hole with wood decayed below the surface.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
710	59	....	Maximum resistance.
620	....	⅛	
595	....	¼	
598	....	⅜	
584	....	½	
571	....	¾	
550	....	1	
538	....	1¼	
498	....	1½	
445	....	1¾	
405	....	2	
410	....	2¼	
430	....	2½	
425	....	2¾	
385	....	3	
392	....	3¼	
405	....	3½	

TIE No. 2.

No. 2144.

Round bolt ″.765 diameter, driven in bored hole ″.565 diameter. Wood decayed below the surface.

Length driven in wood, 5″.10.

Surface in wood, 12.255 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
700	....	⅛	
750	....	¼	
770	....	⅜	
784	....	½	
820	67	¾	Maximum resistance.
750	....	1	
695	....	1¼	
596	....	1½	
555	....	1¾	
524	....	2	
525	....	2¼	
534	....	2½	
514	....	2¾	
480	....	3	

This bolt and No. 2143 were apparently held by the wood near the surface of the tie.

TIE NO. 3.

New chestnut tie; had been cut about eight months. First-class tie.

No. 2129.

Round bolt ″.640 diameter, driven in bored hole ″.565 diameter.
Length driven in wood, 4″.65.
Surface in wood, 9.351 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
3, 190	341	....	Maximum resistance.
2, 610	....	⅛	
2, 280	....	¼	
2, 040	....	⅜	
1, 875	....	½	
1, 700	....	¾	
1, 555	....	1	
1, 460	....	1¼	
1, 370	....	1½	
1, 260	....	1¾	
1, 120	....	2	
1, 015	....	2¼	
900	....	2½	

TIE NO. 3.

No. 2130.

Round bolt ″.750 diameter, driven in bored hole ″.565 diameter.
Length driven in wood, 4″.8.
Surface in wood, 11.309 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
4, 450	393	....	Maximum resistance.
3, 730	....	⅛	
3, 440	....	¼	
3, 250	....	⅜	
3, 105	....	½	
2, 910	....	¾	
2, 670	....	1	
2, 530	....	....	Throbs.
2, 420	....	1¼	
2, 280	....	1½	Throbs repeated.
2, 045	....	1¾	
1, 780	....	2	Throbs repeated.
1, 200	....	2¼	Do.
1, 050	....	2½	Do.

Tie No. 3.

No. 2131.

Round bolt ″.765 diameter, driven in bored hole ″.565 diameter.
Length driven in wood, 4″.80.
Surface in wood, 11.534 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
3, 880	336	....	Maximum resistance.
3, 370	....	⅛	
3, 140	....	¼	
2, 985	....	⅜	
2, 800	....	½	
2, 570	....	¾	
2, 350	....	1	
2, 190	....	1¼	
2, 075	....	1½	
1, 890	....	1¾	
1, 765	....	2	
1, 530	....	2¼	
1, 390	....	2½	

Tie No. 3.

No. 2132.

Railroad spike ″.625 × ″.650, driven without bored hole.
Length driven in wood, 5″.25.
Surface in wood, 13.388 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
4, 640	347	....	Maximum resistance.
3, 560	....	⅛	
3, 250	....	¼	
2, 765	....	½	
2, 475	....	¾	
2, 240	....	1	
1, 980	....	1¼	
1, 720	....	1½	
1, 655	....	1¾	
1, 365	....	2	
1, 140	....	2¼	
965	....	2½	

TIE NO. 3.

No. 2133.

Round bolt ″.650 diameter, driven in hole ″.565 diameter.
Length driven in wood, 4″.45.
Surface in wood, 9.087 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
3,590	395	....	Maximum resistance.
2,775	....	⅛	
2,465	....	¼	
2,310	....	⅜	
2,160	....	½	
1,845	....	¾	
1,675	....	1	
1,538	....	1¼	
1,392	....	1½	
1,255	....	1¾	
1,100	....	2	
982	....	2¼	
825	....	2½	

TIE NO. 3.

No. 2134.

Round bolt ″.750 diameter, driven in hole ″.565 diameter.
Length driven in wood, 5″.
Surface in wood, 11.780 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
3,860	328	....	Maximum resistance.
2,990	....	⅛	
2,710	....	¼	
2,580	....	⅜	
2,495	....	½	
2,245	....	¾	
2,055	....	1	
1,950	....	....	Throbs.
1,700	....	1¼	Throbs repeated.
1,600	....	1½	Do.
1,450	....	1¾	Do.
1,000	....	2	Do.
950	....	2¼	Do.
1,000	....	2½	Do.

TIE NO. 3.

No. 2135.

Round bolt, wedge-shaped at point, corners rounded; diameter, ″.750; driven in bored hole ″.565 diameter.

Length driven in wood, 4″.75.

Surface in wood, 11.191 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
4,015	359	....	Maximum resistance.
3,795	....	1/8	
3,525	....	1/4	
3,390	....	3/8	
3,250	....	1/2	
2,980	....	3/4	
2,640	....	1	
2,420	....	1¼	
2,190	....	1½	
1,960	....	1¾	
1,760	....	2	
1,600	....	2¼	
1,430	....	2½	

TIE NO. 3.

No. 2136.

Round bolt ″.765 diameter, driven in bored hole ″.565 diameter.

Length driven in wood, 5″.10.

Surface in wood, 12.255 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
5,100	416	....	Maximum resistance.
4,150	....	1/8	
3,720	....	1/4	
3,490	....	3/8	
3,270	....	1/2	
2,950	....	3/4	
2,700	....	1	
2,465	....	1¼	
2,285	....	1½	
2,090	....	1¾	
1,945	....	2	
1,800	....	2¼	
1,655	....	2½	

TIE NO. 3.

No. 2137.

Railroad spike ″.625 × ″.625, driven without bored hole.
Length driven in wood, 4″.5.
Surface in wood, 11.25 square inches.

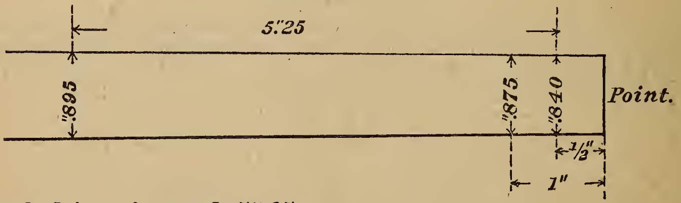
Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
4,120	366	....	Maximum resistance.
3,060	....	⅛	
2,660	....	¼	
2,495	....	⅜	
2,370	....	½	
2,060	....	¾	
1,870	....	1	
1,685	....	1¼	
1,380	....	1½	
1,255	....	1¾	
1,110	....	2	
1,000	....	2¼	
840	....	2½	

TIE NO. 3.

No. 2141.

Round bolt driven in bored hole ″.645 diameter, made with bit.

Diameters of bolt.



Length driven in wood, 5″.25.
Surface in wood, 14.552 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
8,410	578	....	Maximum resistance.
6,850	....	⅛	
5,420	....	¼	
4,810	....	⅜	
4,320	....	½	
3,200	....	¾	Throbs.
3,800	....	....	Resistance increased.
3,300	....	1	Throbs.
2,800	....	1¼	Do.
2,600	....	1½	Do.
2,550	....	1¾	Draws smoothly.
2,190	....	2	
1,940	....	2¼	
1,750	....	2½	
1,580	....	2¾	
1,340	....	3	

TIE NO. 3.

No. 2142.

Round bolt ″.755 diameter, driven in bored hole ″.565 diameter.
Length driven in wood, 5″.10.
Surface in wood, 12.097 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
4,295	355	....	Maximum resistance.
3,855	....	$\frac{1}{8}$	
3,345	....	$\frac{1}{4}$	
3,055	....	$\frac{3}{8}$	
2,886	....	$\frac{1}{2}$	
2,614	....	$\frac{3}{4}$	
2,305	....	1	
2,200	....	$1\frac{1}{4}$	
2,070	....	$1\frac{1}{2}$	
1,930	....	$1\frac{3}{4}$	
1,776	....	2	
1,610	....	$2\frac{1}{4}$	
1,452	....	$2\frac{1}{2}$	

YELLOW PINE BLOCK.

No. 2138.

Round bolt ″.760 diameter, driven in bored hole ″.565 diameter.
Length driven in wood, 4″.60.
Surface in wood, 10.985 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
4,310	392	....	Maximum resistance.
		$\frac{1}{16}$	Throbs.
3,000	....	$\frac{1}{8}$	Do.
2,700	....	$\frac{1}{4}$	Do.
2,400	....	$\frac{3}{8}$	Do.
2,200	....	$\frac{1}{2}$	Do.
2,000	....	$\frac{3}{4}$	Do.
1,860	....	1	Draws smoothly.
1,695	....	$1\frac{1}{4}$	
1,605	....	$1\frac{1}{2}$	
1,495	....	$1\frac{3}{4}$	
1,370	....	2	
1,255	....	$2\frac{1}{4}$	
1,135	....	$2\frac{1}{2}$	

YELLOW PINE BLOCK.

No. 2139.

Railroad spike ″.625 × ″.650, driven without bored hole.
Length driven in wood, 4″.5.
Surface in wood, 11.475 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
3,490	304	....	Maximum resistance.
2,250	....	⅛	Throbs.
2,300	....	¼	Do.
1,880	....	⅜	Draws smoothly.
1,750	....	½	
1,595	....	¾	
1,410	....	1	
1,320	....	1¼	
1,150	....	1½	
1,035	....	1¾	
850	....	2	
668	....	2¼	
500	....	2½	

YELLOW PINE BLOCK.

No. 2140.

Round bolt ″.765 diameter, driven in bored hole ″.565 diameter. Been in fire.
Length driven in wood, 5″.
Surface in wood, 12.015 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
4,845	403	....	Maximum resistance.
3,700	....	⅛	Throbs.
2,770	....	¼	Do.
2,400	....	⅜	Do.
2,220	....	½	Draws smoothly.
1,990	....	¾	
1,895	....	1	
1,690	....	1¼	
1,445	....	1½	
1,250	....	1¾	
1,100	....	2	
1,010	....	2¼	
950	....	2½	

WHITE OAK STICK.

No. 2145.

Round bolt ″.630 diameter, driven in bored hole ″$\frac{7}{16}$ diameter.
Length driven in wood, 4″.60.
Surface in wood, 9.103 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
6,405	704	....	Maximum resistance.
5,380	....	⅛	
4,710	....	¼	
4,375	....	⅜	
4,120	....	½	
3,650	....	¾	
3,400	....	1	
2,900	....	1¼	
2,700	....	1½	
2,650	....	1¾	
2,455	....	2	
2,262	....	2¼	
2,195	....	2½	
1,865	....	2¾	
1,700	....	3	
1,515	....	3¼	
980	....	3½	

WHITE OAK STICK.

No. 2146.

Round bolt ″.630 diameter, driven in bored hole ″.50 diameter.
Length driven in wood, 4″.75.
Surface in wood, 9.400 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
6,990	744	....	Maximum resistance.
5,740	....	⅛	
5,100	....	¼	
4,720	....	⅜	
4,410	....	½	
3,815	....	¾	
3,260	....	1	
2,890	....	1¼	
2,620	....	1½	
2,285	....	1¾	
2,035	....	2	
1,770	....	2¼	
1,510	....	2½	

WHITE OAK STICK.

No. 2147.

Round bolt ″.635 diameter, driven in bored hole $\frac{9}{16}$″ diameter.
Length driven in wood, 4″.2.
Surface in wood, 8.379 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
6, 690	798	....	Maximum resistance.
4, 470	....	⅛	
4, 260	....	¼	
3, 785	....	⅜	
3, 445	....	½	
2, 910	....	¾	
2, 460	....	1	
2, 025	....	1¼	
1, 830	....	1½	
1, 535	....	1¾	
1, 290	....	2	
1, 165	....	2¼	
990	....	2½	

WHITE OAK STICK.

No. 2148.

Round bolt ″.770 diameter, driven in bored hole ⅝″ diameter.
Length driven in wood, 4″.75.
Surface in wood, 11.490 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
9, 610	836	....	Maximum resistance.
8, 630	....	⅛	
7, 745	....	¼	
7, 220	....	⅜	
6, 665	....	½	
5, 815	....	¾	
5, 010	....	1	
4, 620	....	1¼	
4, 210	....	1½	
3, 700	....	1¾	Throbs.
3, 350	....	2	
3, 290	....	2¼	
2, 895	....	2½	
2, 380	....	2¾	
1, 990	....	3	

WHITE OAK STICK.

No. 2149.

Round bolt ″.645 diameter, driven in bored hole ½″ diameter.
Length driven in wood, 4″.50.
Surface in wood, 9.117 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
8, 160	895		Maximum resistance.
7, 290		⅛	
6, 045		¼	
5, 450		⅜	
5, 090		½	
4, 405		¾	
3, 936		1	
3, 650		1¼	Throbs.
2, 950		1½	Do.
2, 600		1¾	Do.
2, 250		2	Do.
2, 000		2¼	Do.
1, 900		2½	Do.

WHITE OAK STICK.

No. 2150.

Railroad spike ″.625×″.625, driven 4″.1 into the wood without bored hole.
Surface in wood, 10.25 square inches.

Adhesive resistance.		Drawn.	Remarks.
Total.	Per square inch.		
Pounds.	*Pounds.*	*Inches.*	
7, 265	709		Maximum resistance.
6, 485		⅛	
5, 190		¼	
4, 570		⅜	
4, 190		½	
3, 425		¾	
2, 965		1	
2, 545		1¼	
2, 124		1½	
1, 790		1¾	
1, 510		2	
1, 295		2¼	
1, 086		2½	

TABULATION OF ADHESION OF SPIKES AND BOLTS IN RAILROAD TIES.

NEW CEDAR TIE. HAD BEEN CUT ABOUT EIGHT MONTHS. IN WET CONDITION.

No. of test.	Diameters.		Length driven.	Surface in wood.	Adhesive resistance.																			Remarks.
	Bolt or spike.	Hole.			Maximum.		When drawn.																	
					Total.	Per square inch.	⅛″	¼″	⅜″	½″	⅝″	¾″	1″	1¼″	1½″	1¾″	2″	2¼″	2½″	2¾″	3″	3¼″	3½″	
	Inch.	*Inch.*	*Inches.*	*Sq. in.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	
2113	.52	.455	4½	7.353	620	84	560	505	480	460	440	405	350	340	320	270	230	.....	190	.....	150	.....	....	
2114	.625×.650	......	5	12.75	1,130	89	1,080	950	860	760	.....	655	630	590	550	440	340	.....	.....	.....	....	.....	....	5½″ railroad spike, without hole.
2115	.645	.455	4.40	8.914	1,095	123	934	815	775	765	.....	755	710	.....	605	545	500	415	330	.....	.....	.....	....	
2116	.645	.520	4.2	8.509	1,262	148	1,060	1,030	1.010	990	.....	920	858	782	745	670	575	500	426	.....	.....	.....	....	
2117	.770	.690	5	12.095	1,840	152	1,695	1,520	1,390	1,280	.....	1,085	950	825	778	732	676	605	555	.....	....	.....	....	
2118	.750	.690	4.8	11.309	1,610	142	1,394	1,185	1,110	1,065	.....	982	930	908	842	785	720	645	598	.....	.....	.....	....	
2119	.750	.690	4.8	11.309	650	57	460	388	338	300	.....	254	220	188	180	180	172	136	128	.....	.....	.....	....	Hole lubricated with block oil.

NEW CEDAR TIE. HAD BEEN CUT ABOUT EIGHT MONTHS. WET, SOUND WOOD.

No. of test.	Bolt or spike.	Hole.	Length driven.	Surface in wood.	Total.	Per square inch.	⅛″	¼″	⅜″	½″	⅝″	¾″	1″	1¼″	1½″	1¾″	2″	2¼″	2½″	2¾″	3″	3¼″	3½″	Remarks.
2120	.760	.690	4.8	11.461	1,808	158	1,510	1,380	1,242	1,175	1,100	1,055	935	795	695	625	588	520	468	.....	.....	.....	....	
2121	.760	.645	4	9.550	1,626	170	1,280	1,190	1,098	1,060	.....	968	860	755	700	620	555	450	350	.....	.....	.....	....	
2122	.750	.645	4.1	9.660	1,300	135	1,120	1,005	970	912	.....	855	800	735	684	610	574	490	405	.....	.....	.....	....	
2123	.654	.455	4.3	8.836	1,834	208	1,525	1,355	1,230	1,154	.....	995	940	850	770	705	650	553	454	.....	.....	.....	....	Driven 44 hours before tested; has rough rusty surface.
2124	.645	.565	4.6	9.320	948	102	780	725	682	650	.....	598	530	478	450	422	430	392	380	372	318	.....	....	
2125	.654	.455	4.35	8.93	1,308	1	1,032	940	870	808	.....	720	676	655	648	600	555	515	470	.....	.....	.....	....	
2126	.654	.455	4.5	9.248	530	57	395	392	330	335	.....	380	378	352	310	300	292	266	230	.....	.....	.....	....	Surface of bolt painted with asphalt varnish.
2127	.650	.455	4.5	9.189	390	42	285	230	225	214	.....	222	192	194	160	144	140	130	115	.....	.....	.....	....	Surface of bolt covered with mastic and white zinc.
2128	.635	.455	4.20	8.379	1,045	125	928	905	864	836	.....	784	742	670	576	465	320	295	260	.....	.....	.....	....	Driven in hole filled with water; tested immediately.
2143	.765	.565	5	12.015	710	59	620	595	598	584	.....	571	550	538	498	445	405	410	430	425	385	392	405	Wood decayed below the surface.
2144	....	......	....	....	....	....	700	750	770	784	.....	820	750	695	596	555	524	525	534	514	480	.....	....	Do.

NEW CHESTNUT TIE. HAD BEEN CUT ABOUT EIGHT MONTHS. FIRST-CLASS TIE.

2129	.640	.565	4.65	9.351	3,190	341	2,610	2,280	2,040	1,875	.....	1,700	1,555	1,460	1,370	1,260	1,120	1,015	900	.....	.....	.....	....	
2130	.750	.565	4.8	11.309	4,450	393	3,730	3,440	3,250	3,105	.....	2,910	2,670	2,420	2,280	2,045	1,780	1,200	1,050	.....	.....	.....	....	
2131	.765	.565	4.8	11.534	3,880	336	3,370	3,140	2,985	2,800	.....	2,570	2,330	2,190	2,075	1,890	1,765	1,530	1,390	.....	.....	.....	....	
2132	.625×.650	......	5.25	13.388	4,640	347	3,560	3,250	.....	2,765	.....	2,475	2,240	1,980	1,720	1,655	1,365	1,140	965	.....	.....	.....	....	Railroad spike; driven without bored hole.
2133	.650	.565	4.45	9.0870	3,590	395	2,775	2,465	2 310	2,160	.....	1,845	1,675	1,538	1,392	1,255	1,100	982	825	.....	.....	.....	...	
2134	.750	.565	5	11.78	3,860	328	2,990	2,710	2,580	2,495	.....	2,245	2,055	1,700	1,600	1,450	1,000	950	1,000	.....	.....	.....	....	
2135	.750	.565	4.75	11.191	4,015	359	3,795	3,525	3,390	3,250	.....	2,980	2,640	2,420	2,190	1,960	1,760	1,600	1,430	.....	.....	.....	....	
2136	.765	.565	5.10	12.255	5,100	416	4,150	3,720	3,490	3,270	.....	2,950	2,700	2,465	2,285	2,090	1,945	1,800	1,655	.....	.....	.....	....	
2137	.625×.625	......	4.5	11.25	4,120	366	3,060	2,660	2,495	2,370	.....	2,060	1,870	1,685	1,380	1,255	1,110	1,000	840	.....	.....	.....	....	Railroad spike; without bored hole.
2141	.840to.895	.645	5.25	14.552	8,410	578	6,850	5,420	4,810	4,320	.....	3,200	3,300	2,800	2,600	2,550	2,190	1,940	1,750	1,580	1,340	.....	....	
2142	.755	.565	5.10	12.097	4,295	355	3,855	3,345	3,055	2,886	.....	2,614	2,305	2,200	2,070	1,930	1,776	1,610	1,452	.....	.....	.....	....	

YELLOW PINE BLOCK.

2138	.760	.565	4.60	10.985	4,310	392	3,000	2,700	2,400	2,200	.....	2,000	1,860	1,695	1,605	1,495	1,370	1,255	1,135	.....	.....	....	....	
2139	.625×.650	......	4.5	11.475	3,490	304	2,250	2,300	1,880	1,750	.....	1,595	1,410	1,320	1,150	1,035	850	668	500	.....	.....	.....	....	Railroad spike; without bored hole.
2140	.765	.565	5	12.015	4,845	403	3,700	2,770	2,400	2,220	.....	1,990	1,895	1,690	1,445	1,250	1,100	1,010	950	.....	.....	.....	....	

WHITE OAK STICK.

2145	.630	$\frac{7}{16}$	4.60	9.103	6,405	704	5,380	4,710	4,375	4,120	.....	3,650	3,400	2,900	2,700	2,650	2,455	2,262	2,195	1,865	1,700	1,515	980	
2146	.630	.50	4.75	9.400	6,990	744	5,740	5,100	4,720	4,410	.....	3,815	3,260	2,890	2,620	2,285	2,035	1,770	1,510	.....	.....	.....	....	
2147	.635	$\frac{9}{16}$	4.2	8.379	6,690	798	4,740	4,260	3,785	3,445	.....	2,910	2,460	2,025	1,830	1,535	1,290	1,165	990	.....	.....	.....	....	
2148	.770	$\frac{5}{8}$	4.75	11.490	9,610	836	8,630	7,745	7,220	6,665	....	5,815	5,010	4,620	4,210	3,700	3,350	3,290	2,895	2,380	1,990	.....	....	
2149	.645	$\frac{1}{2}$	4.50	9.117	8,160	895	7,290	6,045	5,450	5,090	.....	4,405	3,936	3,650	2,950	2,600	2,250	2,000	1,900	.....	.....	.....	....	
2150	.625×.625	......	4.1	10.25	7,265	709	6,485	5,190	4,570	4,190	.....	3,425	2,965	2,545	2,124	1,790	1,510	1,295	1,086	.....	.....	.....	....	

ENDURANCE TESTS OF ROTATING SHAFTS.

CONTINUED FROM REPORT OF 1888.

Tensile tests of metal used in these shafts gave the following results:

Metal.	Marks.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 30 inches.	Contraction of area.	Appearance of fracture.
		Pounds.	*Pounds.*	*Per cent.*	*Per cent.*	
O. H. steel	6–797	55,000	117,440	10.1	14.0	Granular.
O. H. steel	9–756	75,000	141,290	4.3	4.4	Do.
O. H. steel	10–334	79,000	152,550	4.3	5.8	Do.
O. H. steel	4	Tensile test not yet made.				
Cast (gun) iron			*31,220			Granular.

* Mean of two tests.

Five of the eight bars herein reported were ruptured by the rotating test.

Cast-iron bar test, No. 27, was removed from the rotating apparatus and ruptured by direct tensile stress acting longitudinally, parallel to the axis of the bar.

At the middle bearing the diameter of the bar was worn to ″.999 from the original, 1″.000.

The tensile strength of the bar was 21,320 pounds=27,120 pounds per square inch on the original area.

The fracture occurred 3″ from the middle bearing and was located doubtless by the presence of two blow-holes, each about ″.2 diameter.

Cast-iron bar, test No. 30, is yet under test.

Steel bar 10–334, test No. 25, was removed from the machine not ruptured.

Observations were made with this latter bar upon the total deflection under different loads when running at full speed, 1,350 turns per minute, and when slowly turned by hand.

A micrometer was mounted on a cross-bar below and near the middle bearing of the shaft, and measurements taken to the under side of the shaft. Under 30,000 pounds per square inch fiber stress there was no appreciable difference in the deflection when under full speed or when slowly turned.

Under 35,000 pounds per square inch fiber stress, two observations showed the deflection under full speed ″.001 less than when slowly turning.

Under 40,000 pounds per square inch no difference in deflection was observed.

Under 45,000 pounds per square inch the first observation showed the deflection under full speed ″.001 greater than when slowly turning; the second observation showed no difference in the deflection.

Under 50,000 pounds per square inch four observations were made, in each of which the apparent deflection was greater at full speed than when slowly turning. The first showed the deflection under full speed ″.001 greater than when slowly turning; each subsequent observation showed the difference ″.002.

It is not regarded as convincing from these observations that a difference in deflection actually existed, due to the stress and the speed of rotation.

No. 23.—O. H. Steel Bar, 6–797.

Diameter, 1″; speed of rotation, 800 per minute.
Length between end bearings, 33″.
Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
20,000	0	0	*a*	.1991	.1841	.1990	.0149	.0001
			b	.1992	.1844	.1992	.0148	0.
			c	.1990	.1842	.1990	.0148	0.
20,000	50,000	50,000	*a*	.1991	.1841	.1991	.0150	0.
			b	.1992	.1844	.1992	.0148	0.
			c	.1991	.1843	.1991	.0148	0.
30,000	0	50,000	*a*	.1991	.1769	.1991	.0222	0.
			b	.1993	.1770	.1993	.0223	0.
			c	.1992	.1769	.1992	.0223	0.
30,000	50,000	100,000	*a*	.1991	.1763	.1987	.0224	.0004
			b	.1989	.1769	.1989	.0220	0.
			c	.1988	.1768	.1992	.0224	—.0004
30,000	50,000	150,000	*a*	.1991	.1766	.1991	.0225	0.
			b	.1991	.1767	.1992	.0225	—.0001
			c	.1993	.1767	.1993	.0226	0.
40,000	0	150,000	*a*	.1991	.1696	.1991	.0295	0.
			b	.1992	.1696	.1992	.0296	0.
			c	.1992	.1695	.1992	.0297	0.
40,000	50,000	200,000	*a*	.1992	.1690	.1989	.0299	.0003
			b	.1995	.1693	.1991	.0298	.0004
			c	.1994	.1693	.1990	.0297	.0004
40,000	0	200,000	*a*	.1993	.1694	.1990	.0296	.0003
			b	.1994	.1694	.1992	.0298	.0002
			c	.1993	.1692	.1991	.0299	.0002
40,000	50,000	250,000	*a*	.1992	.1690	.1989	.0299	.0003
			b	.1995	.1692	.1992	.0300	.0003
			c	.1994	.1694	.1992	.0298	.0002
40,000	50,000	300,000	*a*	.1993	.1693	.1989	.0296	.0004
			b	.1993	.1693	.1991	.0298	.0002
			c	.1995	.1691	.1992	.0301	.0003
40,000	50,000	350,000	*a*	.1992	.1690	.1990	.0300	.0002
			b	.1995	.1692	.1992	.0300	.0003
			c	.1994	.1693	.1991	.0298	.0003
40,000	50,000	400,000	*a*	.1993	.1692	.1990	.0298	.0003
			b	.1993	.1692	.1991	.0299	.0002
			c	.1994	.1693	.1991	.0298	.0003
40,000	75,000	475,000	*a*	.1989	.1689	.1989	.0300	0.
			b	.1994	.1692	.1991	.0299	.0003
			c	.1996	.1693	.1991	.0298	.0005
Rested 15 hours unloaded.								
40,000	0	475,000	*a*	.1993	.1694	.1990	.0296	.0003
			b	.1995	.1693	.1992	.0299	.0003
			c	.1994	.1694	.1991	.0297	.0003
40,000	125,000	600,000	*a*	.1990	.1689	.1989	.0300	.0001
			b	.1993	.1692	.1992	.0300	.0001
			c	.1996	.1692	.1992	.0300	.0004
40,000	100,000	700,000	*a*	.1991	.1691	.1990	.0299	.0001
			b	.1994	.1692	.1991	.0299	.0003
			c	.1996	.1693	.1992	.0299	.0004
40,000	100,000	800,000	*a*	.1993	.1691	.1989	.0298	.0004
			b	.1994	.1692	.1991	.0299	.0003
			c	.1995	.1692	.1991	.0299	.0004
Rested 39 hours unloaded.								

No. 23.—O. H. Steel Bar, 6-797—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
40, 000	0	800, 000	*a*	.1994	.1700	.1992	.0292	.0002
			b	.1995	.1697	.1993	.0296	.0002
			c	.1993	.1696	.1992	.0296	.0001
40, 000	100, 000	900, 000	*a*	.1992	.1690	.1990	.0300	.0002
			b	.1996	.1693	.1992	.0299	.0004
			c	.1997	.1692	.1994	.0302	.0003
40, 000	100, 000	1, 000, 000	*a*	.1994	.1691	.1990	.0299	.0004
			b	.1996	.1693	.1993	.0300	.0003
			c	.1995	.1693	.1992	.0299	.0003
40, 000	100, 000	1, 100, 000	*a*	.1995	.1691	.1990	.0299	.0005
			b	.1996	.1693	.1992	.0299	.0004
			c	.1995	.1693	.1993	.0300	.0002
40, 000	100, 000	1, 200, 000	*a*	.1995	.1692	.1992	.0300	.0003
			b	.1996	.1693	.1993	.0300	.0003
			c	.1996	.1693	.1993	.0300	.0003
40, 000	100, 000	1, 300, 000	*a*	.1992	.1691	.1990	.0299	.0002
			b	.1995	.1692	.1993	.0301	.0002
			c	.1996	.1692	.1993	.0301	.0003
40, 000	100, 000	1, 400, 000	*a*	.1992	.1692	.1991	.0299	.0001
			b	.1995	.1696	.1992	.0296	.0003
			c	.1996	.1695	.1992	.0297	.0004
40, 000	100, 000	1, 500, 000	*a*	.1991	.1693	.1991	.0298	0.
			b	.1995	.1694	.1993	.0299	.0002
			c	.1996	.1696	.1992	.0296	.0004
40, 000	100, 000	1, 600, 000	*a*	.1993	.1692	.1992	.0300	.0001
			b	.1994	.1692	.1993	.0301	.0001
			c	.1996	.1694	.1992	.0298	.0004
40, 000	100, 000	1, 700, 000	*a*	.1991	.1692	.1990	.0298	.0001
			b	.1996	.1693	.1993	.0300	.0003
			c	.1996	.1695	.1992	.0297	.0004
40, 000	100, 000	1, 800, 000	*a*	.1991	.1690	.1990	.0300	.0001
			b	.1996	.1695	.1992	.0297	.0004
			c	.1996	.1695	.1993	.0298	.0003
40, 000	100, 000	1, 900, 000	*a*	.1994	.1694	.1991	.0297	.0003
			b	.1995	.1694	.1993	.0299	.0002
			c	.1995	.1694	.1992	.0298	.0003
40, 000	100, 000	2, 000, 000	*a*	.1995	.1691	.1991	.0300	.0004
			b	.1996	.1690	.1993	.0303	.0003
			c	.1995	.1693	.1992	.0299	.0003
40, 000	100, 000	2, 100, 000	*a*	.1990	.1689	.1990	.0301	0.
			b	.1996	.1693	.1991	.0298	.0005
			c	.1995	.1693	.1992	.0299	.0003
40, 000	100, 000	2, 200, 000	*a*	.1995	.1692	.1990	.0298	.0005
			b	.1994	.1693	.1992	.0299	.0002
			c	.1995	.1694	.1992	.0298	.0003
40, 000	100, 000	2, 300, 000	*a*	.1990	.1693	.1990	.0297	0.
			b	.1996	.1692	.1993	.0301	.0003
			c	.1996	.1695	.1992	.0297	.0004
40, 000	100, 000	2, 400, 000	*a*	.1991	.1690	.1990	.0300	.0001
			b	.1996	.1695	.1993	.0298	.0003
			c	.1996	.1694	.1993	.0299	.0003
40, 000	100, 000	2, 500, 000	*a*	.1994	.1693	.1991	.0298	.0003
			b	.1997	.1694	.1993	.0299	.0004
			c	.1995	.1693	.1992	.0299	.0003
40, 000	100, 000	2, 600, 000	*a*	.1992	.1693	.1992	.0299	0.
			b	.1995	.1695	.1993	.0298	.0002
			c	.1997	.1694	.1993	.0299	.0004

No. 23.—O. H. Steel Bar, 6–797—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
40, 000	100, 000	2, 700, 000	*a*	.1994	.1695	.1992	.0297	.0001
			b	.1995	.1697	.1993	.0296	.0002
			c	.1996	.1693	.1993	.0300	.0003
40, 000	80, 000	2, 780, 000	*a*	.1990	.1690	.1989	.0299	.0001
			b	.1995	.1691	.1993	.0302	.0002
			c	.1996	.1694	.1992	.0298	.0004
Rested 39 hours unloaded.								
40, 000	120, 000	2, 900, 000	*a*	.1994	.1693	.1992	.0299	.0002
			b	.1997	.1695	.1994	.0299	.0003
			c	.1997	.1694	.1993	.0299	.0004
40, 000	100, 000	3, 000, 000	*a*	.1995	.1693	.1992	.0299	.0003
			b	.1997	.1695	.1994	.0299	.0003
			c	.1997	.1695	.1994	.0299	.0003
40, 000	100, 000	3, 100, 000	*a*	.1992	.1693	.1992	.0299	0.
			b	.1996	.1693	.1993	.0300	.0003
			c	.1997	.1694	.1994	.0300	.0003
40, 000	100, 000	3, 200, 000	*a*	.1992	.1695	.1992	.0298	0.
			b	.1997	.1694	.1994	.0300	.0003
			c	.1997	.1695	.1994	.0299	.0003
40, 000	92, 000	3, 292, 000	*a*	.1995	.1692	.1992	.0300	.0003
			b	.1995	.1694	.1993	.0299	.0002
			c	.1997	.1697	.1994	.0297	.0003
40, 000	108, 000	3, 400, 000	*a*	.1992	.1693	.1992	.0299	0.
			b	.1997	.1694	.1993	.0299	.0004
			c	.1997	.1695	.1994	.0299	.0003
40, 000	100, 000	3, 500, 000	*a*	.1994	.1695	.1992	.0296	.0002
			b	.1996	.1693	.1993	.0300	.0003
			c	.1998	.1694	.1994	.0300	.0004
40, 000	100, 000	3, 600, 000	*a*	.1992	.1692	.1992	.0300	0.
			b	.1997	.1694	.1994	.0300	.0003
			c	.1998	.1693	.1994	.0301	.0004
40, 000	100, 000	3, 700, 000	*a*	.1997	.1694	.1994	.0300	.0003
			b	.1996	.1693	.1994	.0301	.0002
			c	.1997	.1694	.1994	.0300	.0003
40, 000	100, 000	3, 800, 000	*a*	.1996	.1694	.1992	.0298	.0004
			b	.1996	.1694	.1994	.0300	.0002
			c	.1998	.1694	.1994	.0300	.0004
40, 000	100, 000	3, 900, 000	*a*	.1996	.1693	.1994	.0301	.0002
			b	.1996	.1694	.1994	.0300	.0002
			c	.1997	.1695	.1994	.0299	.0003
40, 000	87, 000	3, 987, 000	*a*	.1996	.1693	.1993	.0300	.0003
			b	.1998	.1694	.1995	.0301	.0003
			c	.1997	.1694	.1994	.0300	.0003
40, 000	113, 000	4, 100, 000	*a*	.1994	.1693	.1993	.0300	.0001
			b	.1998	.1693	.1994	.0301	.0004
			c	.1997	.1695	.1994	.0299	.0003
40, 000	100, 000	4, 200, 000	*a*	.1994	.1694	.1992	.0298	.0002
			b	.1998	.1694	.1995	.0301	.0003
			c	.1997	.1694	.1994	.0300	.0003
40, 000	100, 000	4, 300, 000	*a*	.1996	.1693	.1993	.0300	.0003
			b	.1998	.1694	.1994	.0300	.0004
			c	.1997	.1694	.1995	.0301	.0002
40, 000	100, 000	4, 400, 000	*a*	.1994	.1694	.1993	.0299	.0001
			b	.1998	.1694	.1994	.0300	.0004
			c	.1997	.1694	.1994	.0300	.0003
40, 000	100, 000	4, 500, 000	*a*	.1997	.1693	.1994	.0301	.0003
			b	.1997	.1695	.1994	.0299	.0003
			c	.1997	.1694	.1994	.0300	.0003

No. 21.—O. H. Steel Bar, C-797—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
40, 000	100, 000	4, 600, 000	*a*	.1995	.1693	.1993	.0300	.0002
			b	.1996	.1695	.1994	.0299	.0002
			c	.1998	.1694	.1994	.0300	.0004
40, 000	100, 000	4, 700, 000	*a*	.1993	.1694	.1993	.0299	0.
			b	.1998	.1695	.1995	.0300	.0003
			c	.1998	.1695	.1995	.0300	.0003
40, 000	100, 000	4, 800, 000	*a*	.1998	.1694	.1994	.0300	.0004
			b	.1998	.1694	.1995	.0301	.0003
			c	.1998	.1695	.1995	.0300	.0003
40, 000	41, 000	4, 841, 000	Rested 39 hours unloaded.					
40, 000	11, 650	4, 852, 650	Rested 28 hours unloaded.					
40, 000	47, 350	4, 900, 000	*a*	.1994	.1694	.1994	.0300	0.
			b	.1998	.1695	.1996	.0301	.0002
			c	.1999	.1695	.1995	.0300	.0004
40, 000	100, 000	5, 000, 000	*a*	.1998	.1695	.1995	.0300	.0003
			b	.1998	.1696	.1995	.0299	.0003
			c	.1999	.1696	.1995	.0299	.0004
40, 000	100, 000	5, 100, 000	*a*	.1998	.1694	.1995	.0301	.0003
			b	.1997	.1697	.1995	.0298	.0002
			c	.1999	.1698	.1995	.0297	.0004
40, 000	100, 000	5, 200, 000	*a*	.1998	.1698	.1996	.0298	.0002
			b	.1999	.1696	.1996	.0300	.0003
			c	.1999	.1696	.1995	.0299	.0004
40, 000	100, 000	5, 300, 000	*a*	.1995	.1694	.1995	.0301	0.
			b	.1998	.1695	.1995	.0300	.0003
			c	.1998	.1696	.1995	.0299	.0003
40. 000	100, 000	5, 400, 000	*a*	.1995	.1695	.1994	.0299	.0001
			b	.1998	.1696	.1996	.0300	.0002
			c	.1999	.1697	.1996	.0299	.0003
40, 000	100, 000	5, 500, 000	*a*	.1997	.1697	.1994	.0297	.0003
			b	.1998	.1696	.1995	.0299	.0003
			c	.1998	.1694	.1996	.0302	.0002
40, 000	100, 000	5, 600, 000	*a*	.1995	.1695	.1994	.0299	.0001
			b	.1999	.1695	.1996	.0301	.0003
			c	.1999	.1695	.1995	.0300	.0004
40, 000	95, 000	5, 695, 000	*a*	.1995	.1694	.1994	.0300	.0001
			b	.1999	.1696	.1996	.0300	.0003
			c	.2000	.1696	.1997	.0301	.0003
40, 000	105, 000	5, 800, 000	*a*	.1996	.1695	.1995	.0300	.0001
			b	.1998	.1698	.1995	.0297	.0003
			c	.2000	.1698	.1996	.0298	.0004
40, 000	100, 000	5, 900, 000	*a*	.1999	.1698	.1996	.0298	.0003
			b	.1999	.1697	.1995	.0298	.0004
			c	.1999	.1698	.1996	.0298	.0003
40, 000	100, 000	6, 000, 000	*a*	.1996	.1695	.1996	.0301	0.
			b	.1999	.1696	.1996	.0300	.0003
			c	.1999	.1698	.1996	.0298	.0003
40, 000	100, 000	6, 100, 000	*a*	.1999	.1698	.1997	.0299	.0002
			b	.2001	.1698	.1998	.0300	.0003
			c	.2000	.1697	.1997	.0300	.0003
40, 000	200, 000	6, 300, 000	*a*	.1997	.1696	.1996	.0300	.0001
			b	.1999	.1696	.1997	.0301	.0002
			c	.2000	.1696	.1997	.0301	.0003
40, 000	100, 000	6, 400, 000	*a*	.1996	.1694	.1996	.0302	0.
			b	.1999	.1696	.1997	.0301	.0002
			c	.2000	.1697	.1997	.0300	.0003

No. 21.—O. H. Steel Bar, 6–797—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
40, 000	100, 000	6, 500, 000	*a*	.1995	.1696	.1995	.0299	0.
			b	.1997	.1698	.1995	.0297	.0002
			c	.1999	.1696	.1995	.0299	.0004
40, 000	100, 000	6, 600, 000	*a*	.1997	.1694	.1994	.0300	.0003
			b	.1997	.1695	.1995	.0300	.0002
			c	.1999	.1697	.1994	.0297	.0005
40, 000	100, 000	6, 700, 000	*a*	.1993	.1695	.1994	.0299	−.0001
			b	.1999	.1697	.1995	.0298	.0004
			c	.1998	.1696	.1995	.0299	.0003
40, 000	100, 000	6, 800, 000	*a*	.1998	.1697	.1995	.0298	.0003
			b	.1997	.1698	.1995	.0297	.0002
			c	.1998	.1697	.1995	.0298	.0003
40, 000	100, 000	6. 900, 000	*a*	.1995	.1696	.1995	.0299	0.
			b	.1997	.1696	.1995	.0299	.0002
			c	.1999	.1698	.1995	.0297	.0004
40, 000	100, 000	7, 000, 000	*a*	.1999	.1698	.1995	.0297	.0004
			b	.1998	.1698	.1996	.0298	.0002
			c	.1998	.1698	.1995	.0297	.0003
40, 000	100, 000	7, 100, 000	*a*	.1996	.1698	.1995	.0297	.0001
			b	.1998	.1694	.1994	.0300	.0004
			c	.1998	.1695	.1995	.0300	.0003
40, 000	100, 000	7, 200, 000	*a*	.1995	.1696	.1994	.0298	.0001
			b	.1998	.1698	.1996	.0298	.0002
			c	.1999	.1697	.1996	.0299	.0003
40, 000	100, 000	7, 300, 000	*a*	.1995	.1696	.1994	.0298	.0001
			b	.1999	.1697	.1996	.0299	.0003
			c	.2000	.1696	.1996	.0300	.0004
40, 000	100, 000	7, 400, 000	*a*	.1995	.1698	.1995	.0297	0.
			b	.1999	.1697	.1996	.0299	.0003
			c	.1999	.1697	.1996	.0299	.0003
40, 000	100, 000	7, 500, 000	*a*	.1995	.1695	.1995	.0300	0.
			b	.1999	.1697	.1996	.0299	.0003
			c	.1999	.1697	.1996	.0299	.0003
40, 000	100, 000	7, 600, 000	*a*	.1997	.1697	.1995	.0298	.0002
			b	.2000	.1697	.1997	.0300	.0003
			c	.1999	.1697	.1996	.0299	.0003
40, 000	100, 000	7, 700, 000	*a*	.1998	.1698	.1996	.0298	.0002
			b	.1998	.1698	.1996	.0298	.0002
			c	.2000	.1697	.1996	.0299	.0004
40, 000	100, 000	7, 800, 000	*a*	.1998	.1695	.1995	.0300	.0003
			b	.1999	.1695	.1996	.0301	.0003
			c	.1999	.1697	.1996	.0299	.0003
40, 000	100, 000	7, 900, 000	*a*	.1995	.1696	.1995	.0299	0.
			b	.1999	.1696	.1996	.0300	.0003
			c	.2000	.1696	.1996	.0300	.0004
40, 000	94, 000	7, 994, 000	*a*	.1996	.1696	.1995	.0299	.0001
			b	.2000	.1696	.1996	.0300	.0004
			c	.1999	.1696	.1996	.0300	.0003
40, 000	106, 000	8, 100, 000	*a*	.1996	.1696	.1995	.0299	.0001
			b	.1999	.1696	.1994	.0298	.0005
			c	.1996	.1695	.1994	.0299	.0002
40, 000	100, 000	8, 200, 000	*a*	.1997	.1695	.1994	.0299	.0003
			b	.1998	.1696	.1995	.0299	.0003
			c	.1999	.1697	.1995	.0298	.0004
40, 000	100, 000	8, 300, 000	*a*	.1996	.1696	.1994	.0298	.0002
			b	.1998	.1698	.1996	.0298	.0003
			c	.2001	.1699	.1997	.0298	.0004
40, 000	18, 500	8, 318, 500			**Bar ruptured.**			

No. 24.—O. H. Steel Bar, 9–756.

Diameter, 1″. Speed of rotation, 400 per minute.
Length between end bearings, 33″.
Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
50,000	0	0	*a*	.1991	.1618	.1991	.0373	0.
			b	.1992	.1621	.1992	.0371	0.
			c	.1994	.1625	.1994	.0369	0.
50,000	19,000	19,000	Rested 39 hours unloaded.					
50,000	196,500	215,500	Rested 15 hours unloaded.					
50,000	0	215,500	*a*	.1988	.1613	.1987	.0374	.0001
			b	.1992	.1616	.1988	.0372	.0004
			c	.1999	.1619	.1989	.0370	.0010
50,000	183,100	398,600	Rested 15 hours unloaded.					
50,000	0	398,600	*a*	.1990	.1614	.1988	.0374	.0002
			b	.1998	.1616	.1989	.0373	.0009
			c	.1998	.1616	.1991	.0375	.0007
50,000	188,400	587,000	Rested 15 hours unloaded.					
50,000	0	587,000	*a*	.1988	.1613	.1987	.0374	.0001
			b	.1997	.1617	.1990	.0373	.0007
			c	.1999	.1617	.1992	.0375	.0007
50,000	184,000	771,000	Rested 15 hours unloaded.					
50,000	0	771,000	*a*	.1988	.1612	.1987	.0375	.0001
			b	.1997	.1617	.1990	.0373	.0007
			c	.1999	.1618	.1992	.0374	.0007
50,000	183,000	954,000	Rested 15 hours unloaded.					
50,000	0	954,000	*a*	.1988	.1614	.1987	.0373	.0001
			b	.1994	.1615	.1990	.0375	.0004
			c	.2001	.1619	.1993	.0374	.0008
50,000	191,500	1,145,500	Rested 39 hours unloaded.					
50,000	0	1,145,500	*a*	.1996	.1618	.1991	.0373	.0005
			b	.1997	.1618	.1991	.0373	.0006
			c	.1997	.1618	.1992	.0374	.0005
50,000	170,500	1,316,000	Rested 15 hours unloaded.					
50,000	0	1,316,000	*a*	.1990	.1616	.1988	.0372	.0002
			b	.1998	.1617	.1991	.0374	.0007
			c	.2000	.1618	.1993	.0375	.0007
50,000	182,600	1,498 600	Rested 15 hours unloaded.					
50,000	0	1,498,600	*a*	.1988	.1614	.1988	.0374	0.
			b	.1995	.1616	.1990	.0374	.0005
			c	.2001	.1618	.1993	.0375	.0008
50,000	85,400	1,584,000	Rested 15 hours unloaded.					
50,000	0	1,584,000	*a*	.1997	.1615	.1990	.0375	.0007
			b	.1994	.1615	.1990	.0375	.0004
			c	.1999	.1616	.1993	.0377	.0006
50,000	185.000	1,769,000	Bar ruptured.					

No. 25.—O. H. Steel Bar, 10–334.

Diameter, 1″. Speed of rotation, 1,350 per minute.
Length between end bearings, 33″.
Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
30, 000	0	0	*a*	.1991	.1769	.1990	.0221	.0001
			b	.1994	.1773	.1994	.0221	0.
			c	.1991	.1770	.1991	.9221	0.
30, 000	10, 000	10, 000	*a*	.1990	.1769	.1990	.0221	0.
			b	.1994	.1772	.1993	.0221	.0001
			c	.1990	.1769	.1990	.0221	0.
35, 000	1, 000	11, 000	*a*	.1991	.1734	.1990	.0256	.0001
			b	.1994	.1732	.1994	.0262	0.
			c	.1991	.1734	.1991	.0257	0.
35, 000	9, 000	20, 000	*a*	.1991	.1730	.1990	.0260	.0001
			b	.1994	.1735	.1994	.0259	0.
			c	.1991	.1732	.1991	.0259	0.
40, 000	0	0	*a*	.1991	.1699	.1991	.0292	0.
			b	.1994	.1701	.1994	.0293	0.
			c	.1992	.1699	.1992	.0293	0.
40, 000	10, 000	30, 000	*a*	.1991	.1697	.1991	.0294	0.
			b	.1994	.1700	.1994	.0294	0.
			c	.1992	.1698	.1991	.0293	.0001
45, 000	0	30, 000	*a*	.1991	.1657	.1991	.0334	0.
			b	.1994	.1665	.1994	.0329	0.
			c	.1992	.1658	.1992	.0334	0.
45, 000	10, 000	40, 000	*a*	.1991	.1662	.1991	.0329	0.
			b	.1994	.1666	.1994	.0328	0.
			c	.1992	.1658	.1992	.0334	0.
50, 000	0	40, 000	*a*	.1992	.1626	.1991	.0365	.0001
			b	.1994	.1629	.1994	.0365	0.
			c	.1992	.1627	.1991	.0364	.0001
50, 000	10, 000	50, 000	*a*	.1991	.1624	.1991	.0367	0.
			b	.1994	.1625	.1994	.0369	0.
			c	.1992	.1624	.1992	.0368	0.
50, 000	10, 000	60, 000	*a*	.1991	.1621	.1990	.0369	.0001
			b	.1994	.1626	.1994	.0368	0.
			c	.1992	.1622	.1991	.0369	.0001
50, 000	10, 000	70, 000	*a*	.1991	.1619	.1991	.0372	0.
			b	.1994	.1626	.1994	.0368	0.
			c	.1992	.1620	.1991	.0371	.0001
50, 000	10, 000	80, 000	*a*	.1991	.1623	.1990	.0367	.0001
			b	.1994	.1629	.1994	.0365	0.
			c	.1992	.1628	.1992	.0364	0.
Bar removed from machine and allowed to rest 48 days.								
Bar again placed in machine. Speed of rotation reduced to 400 per minute.								
40, 000	0	80, 000	*a*	.1993	.1696	.1993	.0297	0.
			b	.1994	.1699	.1994	.0295	0.
			c	.1993	.1695	.1993	.0298	0.
40, 000	151, 000	231, 000	Rested 15 hours unloaded.					
40, 000	0	231, 000	*a*	.1992	.1696	.1992	.0296	0.
			b	.1995	.1696	.1995	.0299	
			c	.1993	.1694	.1993	.0299	
40, 000	185, 000	416, 000	Rested 39 hours unloaded.					
40, 000	0	416, 000	*a*	.1993	.1695	.1993	.0298	0.
			b	.1995	.1699	.1995	.0296	
			c	.1993	.1694	.1993	.0299	

No. 25.—O. H. Steel Bar, 10-334—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
40,000	187,000	603,000	Rested 15 hours unloaded.					
40,000	0	603,000	*a*	.1993	.1694	.1993	.0299	0.
			b	.1995	.1697	.1995	.0298	0.
			c	.1993	.1695	.1993	.0298	0.
40,000	187,500	790,500	Rested 15 hours unloaded.					
40,000	0	790,500	*a*	.1994	.1697	.1993	.0296	.0001
			b	.1996	.1698	.1996	.0298	0.
			c	.1993	.1697	.1993	.0296	0.
40,000	194,000	984,500	Rested 15 hours unloaded.					
40,000	0	984,500	*a*	.1993	.1694	.1992	.0298	.0001
			b	.1995	.1697	.1995	.0298	0.
			c	.1994	.1695	.1994	.0299	0.
40,000	187,500	1,172,000	Rested 15 hours unloaded.					
40,000	0	1,172,000	*a*	.1993	.1694	.1993	.0299	0.
			b	.1996	.1697	.1995	.0298	.0001
			c	.1994	.1695	.1984	.0299	0.
40,000	144,500	1,316,500	Rested 15 hours unloaded.					
40,000	0	1,316,500	*a*	.1993	.1695	.1993	.0298	0.
			b	.1996	.1699	.1995	.0296	.0001
			c	.1994	.1698	.1994	.0296	0.
40,000	188,500	1,505,000	Rested 39 hours unloaded.					
40,000	0	1,505,000	*a*	.1993	.1697	.1993	.0296	0.
			b	.1995	.1698	.1995	.0297	0.
			c	.1994	.1696	.1994	.0298	0.
40,000	184,000	1,689,000	Rested 15 hours unloaded.					
40,000	0	1,689,000	*a*	.1994	.1697	.1993	.0296	.0001
			b	.1995	.1697	.1995	.0298	0.
			c	.1994	.1696	.1994	.0298	0.
40,000	187,500	1,876,500	Rested 15 hours unloaded.					
40,000	0	1,876,500	*a*	.1994	.1695	.1993	.0298	.0001
			b	.1995	.1698	.1995	.0297	0.
			c	.1994	.1697	.1993	.0296	.0001
40,000	190,000	2,066,500	Rested 15 hours unloaded.					
40,000	0	2,066,500	*a*	.1993	.1695	.1993	.0298	0.
			b	.1995	.1697	.1995	.0298	0.
			c	.1994	.1698	.1994	.0296	0.
40,000	187,200	2,253,700	Rested 15 hours unloaded.					
40,000	0	2,253,700	*a*	.1994	.1698	.1993	.0295	.0001
			b	.1996	.1697	.1996	.0299	0.
			c	.1994	.1696	.1994	.0298	0.
40,000	194,800	2,448,500	Rested 15 hours unloaded.					
40,000	0	2,448,500	*a*	.1994	.1698	.1994	.0296	0.
			b	.1996	.1698	.1996	.0298	0.
			c	.1995	.1698	.1995	.0297	0.
40,000	182,500	2,631,000	Rested 39 hours unloaded.					
40,000	0	2,631,000	*a*	.1994	.1696	.1994	.0298	0.
			b	.1996	.1699	.1996	.0297	0.
			c	.1995	.1698	.1995	.0297	0.
40,000	157,000	2,788,000	Rested 15 hours unloaded.					
40,000	94,800	2,882,800	Rested 15 hours unloaded.					

No. 25.—O. H. STEEL BAR, 10-334—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
40,000	0	2,882,800	*a*	.1994	.1699	.1994	.0295	0.
			b	.1996	.1699	.1996	.0297	0.
			c	.1995	.1698	.1995	.0297	0.
40,000	173,200	3,056,000	Rested 15 hours unloaded.					
40,000	0	3,056,000	*a*	.1994	.1696	.1994	.0298	0.
			b	.1996	.1698	.1996	.0298	0.
			c	.1995	.1697	.1995	.0298	0.
40,000	129,650	3,185,650	Rested 17 hours unloaded.					
40,000	119,200	3,304,850	Rested 15 hours unloaded.					
40,000	0	3,304,850	*a*	.1994	.1696	.1994	.0298	0.
			b	.1996	.1699	.1996	.0297	0.
			c	.1995	.1698	.1994	.0296	.0001
40,000	236,350	3,541,200	Rested 39 hours unloaded.					
40,000	0	3,541,200	*a*	.1995	.1696	.1994	.0298	.0001
			b	.1997	.1698	.1996	.0298	.0001
			c	.1995	.1696	.1995	.0299	0.
40,000	139,400	3,680,600	Rested 15 hours unloaded.					
40,000	0	3,680,600	*a*	.1995	.1696	.1994	.0298	.0001
			b	.1996	.1699	.1996	.0297	0.
			c	.1995	.1698	.1995	.0297	0.
40,000	188,400	3,869,000	Rested 15 hours unloaded.					
40,000	0	3,869,000	*a*	.1995	.1699	.1995	.0296	0.
			b	.1996	.1699	.1996	.0297	0.
			c	.1995	.1698	.1995	.0297	0.
40,000	191,200	4,060,200	Rested 15 hours unloaded.					
40,000	0	4,060,200	*a*	.1995	.1696	.1994	.0298	.0001
			b	.1997	.1700	.1997	.0297	0.
			c	.1996	.1696	.1996	.0300	0.
40,000	368,300	4,428,500	Rested 15 hours unloaded.					
40,000	0	4,428,500	*a*	.1995	.1697	.1995	.0298	0.
			b	.1997	.1699	.1996	.0297	.0001
			c	.1995	.1698	.1995	.0297	0.
40,000	178,000	4,606,500	Rested 39 hours unloaded.					
40,000	0	4,606,500	*a*	.1995	.1699	.1995	.0296	0.
			b	.1997	.1700	.1997	.0297	0.
			c	.1996	.1699	.1995	.0296	.0001
40,000	181,750	4,788,250	Rested 15 hours unloaded.					
40,000	0	4,788,250	*a*	.1995	.1700	.1995	.0295	0.
			b	.1996	.1699	.1996	.0297	0.
			c	.1995	.1698	.1995	.0297	0.
40,000	176,750	4,965,000	Rested 15 hours unloaded.					
40,000	0	4,965,000	*a*	.1995	.1699	.1995	.0296	0.
			b	.1997	.1699	.1997	.0298	0.
			c	.1995	.1699	.1995	.0296	0.
40,000	184,400	5,149,400	Rested 15 hours unloaded.					
40,000	0	5,149,400	*a*	.1995	.1697	.1995	.0298	0.
			b	.1996	.1699	.1996	.0297	0.
			c	.1996	.1699	.1996	.0297	0.
40,000	172,800	5,322,200	Rested 15 hours unloaded.					

No. 25.—O. H. Steel Bar, 10–334—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Uuloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
40, 000	0	5. 322, 200	*a*	.1995	.1700	.1995	.0295	0.
			b	.1996	.1701	.1996	.0295	0.
			c	.1995	.1699	.1995	.0296	0.
40, 000	187, 800	5, 510, 000	Rested 15 hours unloaded.					
40, 000	0	5, 510, 000	*a*	.1995	.1701	.1994	.0293	.0001
			b	.1996	.1699	.1996	.0297	0.
			c	.1996	.1699	.1995	.0296	.0001
40, 000	187, 200	5, 697, 200	Rested 39 hours unloaded.					
40, 000	0	5, 697, 200	*a*	.1995	.1699	.1995	.0296	0.
			b	.1996	.1699	.1996	.0297	0.
			c	.1995	.1700	.1995	.0295	0.
40, 000	172, 000	5, 869, 200	Rested 15 hours unloaded.					
40, 000	0	5, 869, 200	*a*	.1995	.1699	.1995	.0296	0.
			b	.1997	.1700	.1997	.0297	0.
			c	.1996	.1699	.1995	.0296	.0001
40, 000	307, 000	6, 176, 200	*a*	.1995	.1701	.1995	.0294	0.
			b	.1997	.1700	.1997	.0297	0.
			c	.1996	.1696	.1996	.0300	0.
40, 000	179, 000	6, 355, 200	*a*	.1996	.1701	.1995	.0294	.0001
			b	.1996	.1699	.1996	.0297	0.
			c	.1996	.1698	.1996	.0298	0.
40, 000	188, 800	6, 544, 000	*a*	.1996	.1701	.1995	.0294	.0001
			b	.1995	.1698	.1995	.0297	0.
			c	.1997	.1699	.1997	.0298	0.
40, 000	188, 900	6, 732, 900	*a*	.1995	.1700	.1995	.0295	0.
			b	.1997	.1701	.1997	.0296	0.
			c	.1996	.1700	.1996	.0296	0.
40, 000	186, 100	6, 919, 000	*a*	.1996	.1700	.1995	.0295	.0001
			b	.1997	.1700	.1997	.0297	0.
			c	.1996	.1698	.1996	.0298	0.
40, 000	182, 000	7, 101, 000	*a*	.1996	.1701	.1995	.0294	.0001
			b	.1996	.1701	.1996	.0295	0.
			c	.1996	.1700	.1996	.0296	0.
40, 000	179, 350	7, 280, 350	*a*	.1996	.1700	.1995	.0295	.0001
			b	.1997	.1700	.1997	.0297	0.
			c	.1996	.1699	.1996	.0297	0.
40, 000	190, 650	7, 471, 000	*a*	.1996	.1699	.1996	.0297	0.
			b	.1998	.1700	.1997	.0297	.0001
			c	.1996	.1699	.1996	.0297	0.
40, 000	157, 400	7, 628, 400	*a*	.1996	.1699	.1995	.0296	.0001
			b	.1997	.1701	.1997	.0296	0.
			c	.1997	.1700	.1997	.0297	0.
40, 000	188, 880	7, 817, 280	*a*	.1996	.1699	.1996	.0297	0.
			b	.1998	.1699	.1997	.0298	.0001
			c	.1996	.1699	.1996	.0297	0.
40, 000	157, 920	7, 975, 200	*a*	.1996	.1702	.1996	.0294	0.
			b	.1998	.1700	.1998	.0298	0.
			c	.1996	.1699	.1996	.0297	0.
40, 000	186, 800	8, 162, 000	*a*	.1996	.1699	.1996	.0297	0.
			b	.1998	.1700	.1998	.0298	0.
			c	.1996	.1699	.1996	.0297	0.
40, 000	178, 750	8, 340, 750	*a*	.1997	.1701	.1996	.0295	.0001
			b	.1999	.1701	.1998	.0297	.0001
			c	.1997	.1699	.1996	.0297	.0001

No. 25.—O. H. Steel Bar, 10–334—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
40,000	185,850	8,526,600	*a*	.1997	.1701	.1996	.0295	.0001
			b	.1999	.1702	.1999	.0297	0.
			c	.1997	.1700	.1997	.0297	0.
40,000	186,600	8,713,200	*a*	.1997	.1700	.1996	.0296	.0001
			b	.1999	.1700	.1999	.0299	0.
			c	.1997	.1700	.1997	.0297	0.
40,000	190,360	8,903,560	*a*	.1997	.1701	.1997	.0296	0.
			b	.1999	.1701	.1998	.0297	.0001
			c	.1998	.1701	.1998	.0297	0.
40,000	189,640	9,093,200	*a*	.1997	.1699	.1996	.0297	.0001
			b	.1999	.1701	.1999	.0298	0.
			c	.1998	.1691	.1998	.0307	0.
40,000	188,300	9,281,500	*a*	.1997	.1700	.1996	.0296	.0001
			b	.1998	.1700	.1998	.0298	0.
			c	.1997	.1699	.1997	.0298	0.
40,000	184,900	9,466,400	*a*	.1998	.1690	.1997	.0298	.0001
			b	.1999	.1702	.1999	.0297	0.
			c	.1998	.1700	.1998	.0298	0.
40,000	187,500	9,653,900	*a*	.1997	.1702	.1997	.0295	0.
			b	.1999	.1702	.1999	.0297	0.
			c	.1998	.1700	.1998	.0298	0.
40,000	189,500	9,843,400	*a*	.1998	.1703	.1998	.0295	0.
			b	.1999	.1702	.1999	.0297	0.
			c	.1999	.1701	.1998	.0297	.0001
40,000	236,600	10,080,000	*a*	.1998	.1700	.1997	.0297	.0001
			b	.1999	.1702	.1999	.0297	0.
			c	.1998	.1700	.1998	.0298	0.

Bar removed from machine.

No. 26.—O. H. Steel Bar, 4.

Diameter, 1″. Speed of rotation, 400 per minute.
Length between end bearings, 33″.
Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
20,000	0.	0.	*a*	.2004	.1856	.2004	.0148	0.
			b	.2004	.1854	.2003	.0149	.0001
			c	.2004	.1855	.2004	.0149	0.
20,000	191,000	191,000	*a*	.2004	.1856	.2004	.0148	0.
			b	.2003	.1854	.2003	.0149	0.
			c	.2004	.1854	.2003	.0149	.0001
20,000	190,500	381,500	*a*	.2004	.1857	.2004	.0147	0.
			b	.2004	.1855	.2003	.0148	.0001
			c	.2004	.1856	.2004	.0148	0.
20,000	189,500	571,000	*a*	.2005	.1855	.2004	.0149	.0001
			b	.2005	.1856	.2004	.0148	.0001
			c	.2005	.1855	.2004	.0149	.0001
20,000	191,000	762,000	*a*	.2004	.1854	.2004	.0150	0.
			b	.2005	.1854	.2004	.0150	.0001
			c	.2005	.1855	.2005	.0150	0.
20,000	189,100	951,100	*a*	.2005	.1855	.2004	.0149	.0001
			b	.2005	.1856	.2005	.0149	0.
			c	.2005	.1856	.2005	.0149	0.
25,000	100,000	1,051,100	*a*	.2005	.1818	.2004	.0186	.0001
			b	.2005	.1818	.2004	.0186	.0001
			c	.2005	.1819	.2004	.0185	.0001
30,000	238,900	1,290,000	*a*	.2004	.1782	.2004	.0222	0.
			b	.2005	.1781	.2004	.0223	.0001
			c	.2005	.1779	.2005	.0226	0.
35,000	100,000	1,390,000	*a*	.2005	.1744	.2005	.0261	0.
			b	.2006	.1745	.2005	.0260	.0001
			c	.2006	.1745	.2005	.0260	.0001
40,000	50,000	1,440,000	*a*	.2005	.1713	.2004	.0291	.0001
			b	.2005	.1707	.2004	.0297	.0001
			c	.2005	.1706	.2004	.0298	.0001
40,000	50,000	1,490,000	*a*	.2006	.1715	.2005	.0290	.0001
			b	.2006	.1706	.2004	.0298	.0002
			c	.2006	.1713	.2004	.0291	.0002
40,000	50,000	1,540,000	*a*	.2006	.1714	.2004	.0290	.0002
			b	.2006	.1714	.2004	.0290	.0002
			c	.2006	.1709	.2004	.0295	.0002
40,000	50,000	1,590,000	*a*	.2006	.1709	.2003	.0294	.0003
			b	.2006	.1708	.2004	.0296	.0002
			c	.2005	.1706	.2004	.0298	.0001
45,000	50,000	1,640,000	*a*	.2006	.1664	.2004	.0340	.0002
			b	.2007	.1674	.2004	.0330	.0003
			c	.2007	.1674	.2004	.0330	.0003
45,000	50,000	1,690,000	*a*	.2004	.1664	.2003	.0339	.0001
			b	.2007	.1674	.2004	.0330	.0003
			c	.2008	.1673	.2004	.0331	.0004
45,000	50,000	1,740,000	*a*	.2005	.1667	.2002	.0335	.0003
			b	.2004	.1670	.2002	.0332	.0002
			c	.2008	.1671	.2003	.0332	.0005
45,000	50,000	1,790,000	*a*	.2005	.1670	.2002	.0332	.0003
			b	.2004	.1669	.2000	.0331	.0004
			c	.2006	.1667	.2002	.0335	.0004
45,000	50,000	1,840,000	*a*	.2005	.1663	.2000	.0337	.0005
			b	.2007	.1663	.2001	.0338	.0006
			c	.2006	.1663	.2000	.0337	.0006

No. 26.—O. H. Steel Bar, 4—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
45, 000	50, 000	1, 890, 000	*a*	.2002	.1664	.2001	.0337	.0001
			b	.2005	.1665	.2000	.0335	.0005
			c	.2008	.1663	.2000	.0337	.0008
45, 000	50, 000	1, 940, 000	*a*	.2003	.1668	.2001	.0333	.0002
			b	.2007	.1674	.2002	.0328	.0005
			c	.2008	.1663	.2002	.0339	.0006
45, 000	50, 000	1, 990, 000	*a*	.2003	.1665	.2001	.0336	.0002
			b	.2008	.1669	.2002	.0333	.0006
			c	.2008	.1669	.2003	.0334	.0005
45, 000	50, 000	2, 040, 000	*a*	.2008	.1670	.2003	.0333	.0005
			b	.2005	.1663	.2002	.0339	.0003
			c	.2008	.1665	.2003	.0338	.0005
45, 000	50, 000	2, 090, 000	*a*	.2008	.1665	.2003	.0338	.0005
			b	.2008	.1666	.2002	.0336	.0006
			c	.2008	.1664	.2003	.0339	.0005
45, 000	50, 000	2, 140, 000	*a*	.2005	.1661	.2001	.0340	.0004
			b	.2008	.1664	.2002	.0338	.0006
			c	.2008	.1667	.2003	.0336	.0005
45, 000	50, 000	2, 190, 000	*a*	.2005	.1665	.2003	.0338	.0002
			b	.2008	.1674	.2004	.0330	.0004
			c	.2008	.1668	.2003	.0325	.0005
45, 000	50, 000	2, 240, 000	*a*	.2011	.1672	.2004	.0332	.0007
			b	.2007	.1666	.2003	.0337	.0004
			c	.2008	.1668	.2004	.0336	.0004
45, 000	50, 000	2, 290, 000	*a*	.2003	.1666	.2002	.0336	.0001
			b	.2007	.1668	.2003	.0335	.0004
			c	.2008	.1667	.2004	.0337	.0004
45, 000	50, 000	2, 340, 000	*a*	.2009	.1668	.2003	.0335	.0006
			b	.2006	.1670	.2003	.0333	.0003
			c	.2008	.1665	.2003	.0338	.0005
45, 000	50, 000	2, 390, 000	*a*	.2006	.1672	.2003	.0331	.0003
			b	.2006	.1666	.2002	.0336	.0004
			c	.2009	.1666	.2003	.0337	.0006
45, 000	50, 000	2, 440, 000	*a*	.2010	.1663	.2003	.0340	.0007
			b	.2008	.1663	.2003	.0340	.0005
			c	.2008	.1671	.2003	.0332	.0005
45, 000	50, 000	2, 490, 000	*a*	.2003	.1664	.2002	.0338	.0001
			b	.2009	.1672	.2002	.0330	.0007
			c	.2009	.1665	.2003	.0338	.0006
45, 000	50, 000	2, 540, 000	*a*	.2006	.1670	.2003	.0333	.0003
			b	.2009	.1671	.2003	.0332	.0006
			c	.2008	.1666	.2003	.0337	.0005
45, 000	50, 000	2, 590, 000	*a*	.2010	.1664	.2003	.0339	.0007
			b	.2008	.1668	.2003	.0335	.0005
			c	.2008	.1665	.2003	.0338	.0005
45, 000	55, 000	2, 645, 000	*a*	.2006	.1655	.1999	.0344	.0007
			b	.2009	.1673	.2003	.0330	.0006
			c	.2010	.1673	.2004	.0331	.0006
45, 000	9, 200	2, 654, 200	Bar ruptured.					

No. 27.—Cast (Gun) Iron Bar, No. 1.

Diameter, 1″. Speed of rotation, 400 per minute.
Length between end bearings, 33″.
Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
10,000	0	0	*a*	.1994	.1874	.1990	.0116	.0004
			b	.1994	.1874	.1989	.0115	.0005
			c	.1994	.1873	.1988	.0115	.0006
10,000	81,000	81,000	*a*	.1994	.1876	.1993	.0117	.0001
			b	.1993	.1873	.1990	.0117	.0003
			c	.1993	.1872	.1989	.0117	.0004
10,000	189,000	270,000	*a*	.1994	.1875	.1992	.0117	.0002
			b	.1993	.1873	.1990	.0117	.0003
			c	.1993	.1873	.1989	.0116	.0004
10,000	264,000	534,000	*a*	.1996	.1875	.1993	.0118	.0003
			b	.1993	.1871	.1989	.0118	.0004
			c	.1994	.1873	.1990	.0117	.0004
10,000	189,900	723,900	*a*	.1998	.1876	.1993	.0117	.0005
			b	.1992	.1870	.1989	.0119	.0003
			c	.1993	.1872	.1990	.0118	.0003
10,000	168,300	892,200	*a*	.1997	.1877	.1993	.0116	.0004
			b	.1992	.1871	.1989	.0118	.0003
			c	.1994	.1874	.1991	.0117	.0003
10,000	184,800	1,077,000	*a*	.1997	.1874	.1994	.0120	.0003
			b	.1992	.1872	.1989	.0117	.0003
			c	.1994	.1874	.1990	.0116	.0004
10,000	119,600	1,196,600	*a*	.1996	.1876	.1994	.0118	.0002
			b	.1992	.1872	.1990	.0118	.0002
			c	.1995	.1874	.1991	.0117	.0004
10,000	157,400	1,354,000	*a*	.1993	.1875	.1993	.0118	0.
			b	.1992	.1872	.1989	.0117	.0003
			c	.1994	.1874	.1990	.0116	.0004
10,000	190,000	1,544,000	*a*	.1995	.1875	.1993	.0118	.0002
			b	.1992	.1872	.1990	.0118	.0002
			c	.1994	.1873	.1992	.0119	.0002
10,000	192,500	1,736,500	*a*	.1997	.1875	.1994	.0119	.0003
			b	.1991	.1872	.1990	.0118	.0001
			c	.1995	.1874	.1991	.0117	.0004
10,000	176,900	1,913,400	*a*	.1997	.1874	.1994	.0120	.0003
			b	.1993	.1873	.1990	.0117	.0003
			c	.1994	.1873	.1991	.0118	.0003
10,000	303,600	2,217,000	*a*	.1997	.1876	.1994	.0118	.0003
			b	.1994	.1872	.1990	.0118	.0004
			c	.1994	.1872	.1992	.0120	.0002
10,000	183,150	2,400,150	*a*	.1994	.1875	.1993	.0118	.0001
			b	.1994	.1873	.1990	.0117	.0004
			c	.1995	.1874	.1992	.0118	.0003
10,000	186,850	2,587,000	*a*	.1995	.1876	.1994	.0118	.0001
			b	.1994	.1873	.1990	.0117	.0004
			c	.1995	.1874	.1992	.0118	.0003
10,000	187,200	2,774,200	*a*	.1995	.1875	.1994	.0119	.0001
			b	.1994	.1874	.1990	.0116	.0004
			c	.1994	.1874	.1991	.0117	.0003
10,000	188,800	2,963,000	*a*	.1998	.1876	.1994	.0118	.0004
			b	.1994	.1872	.1990	.0118	.0004
			c	.1994	.1873	.1991	.0118	.0003

No. 27.—Cast (Gun) Iron Bar, No. 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
10, 000	157, 670	3, 120, 670	*a*	.1998	.1876	.1994	.0118	.0004
			b	.1993	.1872	.1990	.0118	.0003
			c	.1994	.1873	.1992	.0119	.0002
10, 000	184, 330	3, 505, 000	*a*	.1997	.1876	.1995	.0119	.0002
			b	.1992	.1872	.1990	.0118	.0002
			c	.1995	.1874	.1992	.0118	.0003
10, 000	156, 000	3, 461, 000	*a*	.1996	.1876	.1994	.0118	.0002
			b	.1992	.1871	.1990	.0119	.0002
			c	.1995	.1874	.1992	.0118	.0003
10, 000	188, 200	3, 649, 200	*a*	.1995	.1876	.1994	.0118	.0001
			b	.1994	.1873	.1991	.0118	.0003
			c	.1995	.1875	.1992	.0117	.0003
10, 000	177, 800	3, 827, 000	*a*	.1997	.1878	.1994	.0116	.0003
			b	.1993	.1873	.1991	.0118	.0002
			c	.1994	.1874	.1992	.0118	.0002
10, 000	189, 000	4, 016, 000	*a*	.1996	.1877	.1995	.0118	.0001
			b	.1994	.1873	.1991	.0118	.0003
			c	.1995	.1875	.1992	.0117	.0003
10, 000	192, 100	4, 208, 100	*a*	.1996	.1877	.1995	.0118	.0001
			b	.1993	.1873	.1991	.0118	.0002
			c	.1995	.1875	.1991	.0116	.0004
10, 000	183, 900	4, 392, 000	*a*	.1998	.1876	.1994	.0118	.0004
			b	.1994	.1874	.1991	.0117	.0003
			c	.1995	.1875	.1993	.0118	.0002
10, 000	191, 000	4, 583, 000	*a*	.1996	.1877	.1994	.0117	.0002
			b	.1994	.1873	.1990	.0117	.0004
			c	.1995	.1874	.1992	.0118	.0003
10, 000	190, 000	4, 773, 000	*a*	.1997	.1877	.1995	.0118	.0002
			b	.1994	.1872	.1990	.0118	.0004
			c	.1995	.1875	.1952	.0117	.0003
10, 000	187, 200	4, 960, 200	*a*	.1996	.1876	.1995	.0119	.0001
			b	.1994	.1874	.1992	.0118	.0002
			c	.1995	.1874	.1993	.0119	.0002
10, 000	183, 800	5, 144, 000	*a*	.1997	.1877	.1995	.0118	.0002
			b	.1993	.1873	.1990	.0117	.0003
			c	.1995	.1874	.1992	.0118	.0003
10, 000	190, 000	5, 334, 000	*a*	.1998	.1877	.1995	.0118	.0003
			b	.1993	.1873	.1990	.0117	.0003
			c	.1995	.1875	.1992	.0117	.0003
10, 000	189, 000	5, 523, 000	*a*	.1997	.1877	.1994	.0117	.0003
			b	.1994	.1873	.1991	.0118	.0003
			c	.1995	.1875	.1992	.0117	.0003
10, 000	190, 500	5, 713, 500	*a*	.1997	.1876	.1995	.0119	.0002
			b	.1995	.1874	.1991	.0117	.0004
			c	.1995	.1875	.1993	0118	.0002
10, 000	178, 500	5, 892, 000	*a*	.1996	.1878	.1995	.0117	.0001
			b	.1994	.1874	.1991	.0117	.0003
			c	.1995	.1874	.1992	.0118	.0003
10, 000	188, 000	6, 080, 000	*a*	.1996	.1877	.1994	.0117	.0002
			b	.1993	.1873	.1991	.0118	.0002
			c	.1996	.1875	.1992	.0117	.0004
10, 000	187, 000	6, 267, 000	*a*	.1998	.1876	.1995	.0119	.0003
			b	.1993	.1872	.1991	.0119	.0002
			c	.1995	.1874	.1992	.0118	.0003
10, 000	174, 000	6, 441, 000	*a*	.1996	.1887	.1994	.0117	.0002
			b	.1995	.1874	.1992	.0118	.0003
			c	.1995	.1877	.1992	.0115	.0003

No. 27.—Cast (Gun) Iron Bar, No. 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
10,000	186,000	6,627,000	*a*	.1996	.1876	.1995	.0119	.0001
			b	.1994	.1873	.1992	.0119	.0002
			c	.1995	.1876	.1993	.0117	.0002
10,000	182,000	6,809,000	*a*	.1998	.1877	.1996	.0119	.0002
			b	.1993	.1874	.1991	.0117	.0002
			c	.1996	.1875	.1992	.0117	.0004
10,000	182,500	6,991,500	*a*	.1997	.1877	.1995	.0118	.0002
			b	.1993	.1873	.1991	.0118	.0002
			c	.1997	.1875	.1993	.0118	.0004
10,000	189,500	7,181,000	*a*	.1996	.1877	.1995	.0118	.0001
			b	.1993	.1873	.1991	.0118	.0002
			c	.1995	.1875	.1993	.0118	.0002
10,000	151,600	7,332,600	*a*	.1997	.1877	.1995	.0118	.0002
			b	.1993	.1873	.1991	.0118	.0002
			c	.1996	.1876	.1993	.0117	.0003
10,000	183,400	7,516,000	*a*	.1996	.1877	.1995	.0118	.0001
			b	.1994	.1873	.1991	.0118	.0003
			c	.1997	.1876	.1993	.0117	.0004
10,000	189,500	7,705,500	*a*	.1999	.1877	.1995	.0118	.0004
			b	.1994	.1873	.1991	.0118	.0003
			c	.1995	.1876	.1992	.0116	.0003
10,000	187,500	7,893,000	*a*	.1998	.1878	.1995	.0117	.0003
			b	.1994	.1873	.1991	.0118	.0003
			c	.1996	.1876	.1993	.0117	.0003
10,000	188,600	8,081,600	*a*	.1999	.1878	.1995	.0117	.0004
			b	.1995	.1874	.1992	.0118	.0003
			c	.1996	.1875	.1993	.0118	.0003
10,000	189,400	8,271,000	*a*	.1997	.1877	.1995	.0118	.0002
			b	.1994	.1874	.1991	.0117	.0003
			c	.1996	.1876	.1993	.0117	.0003
10,000	187,000	8,458,000	*a*	.1999	.1877	.1996	.0119	.0003
			b	.1995	.1874	.1992	.0118	.0003
			c	.1997	.1875	.1993	.0118	.0004
10,000	188,000	8,646,000	*a*	.1999	.1878	.1995	.0117	.0004
			b	.1994	.1874	.1992	.0118	.0002
			c	.1997	.1876	.1993	.0117	.0004
10,000	187,000	8,833,000	*a*	.1998	.1877	.1996	.0119	.0002
			b	.1994	.1874	.1992	.0118	.0002
			c	.1996	.1875	.1994	.0119	.0002
10,000	192,000	9,025,000	*a*	.1999	.1878	.1997	.0119	.0002
			b	.1994	.1874	.1992	.0118	.0002
			c	.1996	.1875	.1993	.0118	.0003
10,000	188,000	9,213,000	*a*	.1998	.1877	.1995	.0118	.0003
			b	.1994	.1874	.1992	.0118	.0002
			c	.1997	.1876	.1993	.0117	.0004
10,000	189,000	9,402,000	*a*	.1999	.1878	.1997	.0119	.0002
			b	.1994	.1874	.1991	.0117	.0003
			c	.1997	.1877	.1994	.0117	.0003
10,000	188,000	9,590,000	*a*	.1998	.1877	.1995	.0118	.0003
			b	.1995	.1874	.1993	.0119	.0002
			c	.1997	.1875	.1993	.0118	.0004
10,000	189,500	9,779,500	*a*	.1998	.1877	.1995	.0118	.0003
			b	.1994	.1874	.1992	.0118	.0002
			c	.1997	.1876	.1994	.0118	.0003
10,000	186,500	9,966,000	*a*	.1999	.1878	.1997	.0119	.0002
			b	.1994	.1874	.1992	.0118	.0002
			c	.1998	.1877	.1995	.0118	.0003

No. 27.—Cast (Gun) Iron Bar, No. 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
10,000	189,500	10,155,500	*a*	.1997	.1877	.1996	.0119	.0001
			b	.1994	.1874	.1992	.0118	.0002
			c	.1997	.1876	.1994	.0118	.0003
10,000	190,900	10,346,400	*a*	.1999	.1878	.1996	.0118	.0003
			b	.1995	.1875	.1993	.0118	.0002
			c	.1997	.1878	.1994	.0116	.0003
10,000	187,600	10,534,000	*a*	.1997	.1877	.1995	.0118	.0002
			b	.1995	.1874	.1993	.0119	.0002
			c	.1998	.1876	.1996	.0120	.0002
10,000	183,100	10,717,100	*a*	.1999	.1877	.1996	.0119	.0003
			b	.1994	.1875	.1992	.0117	.0002
			c	.1997	.1876	.1994	.0118	.0003
10,000	175,900	10,893,000	*a*	.1997	.1877	.1996	.0119	.0001
			b	.1996	.1875	.1992	.0117	.0004
			c	.1996	.1876	.1994	.0118	.0002
10,000	188,300	11,081,300	*a*	.1998	.1877	.1996	.0119	.0002
			b	.1995	.1875	.1993	.0118	.0002
			c	.1999	.1875	.1994	.0119	.0005
10,000	190,700	11,272,000	*a*	.1999	.1878	.1996	.0118	.0003
			b	.1996	.1874	.1994	.0120	.0002
			c	.1996	.1876	.1994	.0118	.0002
10,000	189,000	11,461,000	*a*	.1996	.1878	.1995	.0117	.0001
			b	.1996	.1874	.1993	.0119	.0003
			c	.1997	.1878	.1994	.0116	.0003
10,000	182,500	11,643,500	*a*	.1999	.1878	.1996	.0118	.0003
			b	.1994	.1874	.1992	.0118	.0002
			c	.1997	.1877	.1994	.0117	.0003
10,000	189,500	11,833,000	*a*	.1997	.1877	.1996	.0119	.0001
			b	.1995	.1874	.1992	.0118	.0003
			c	.1997	.1874	.1993	.0119	.0004
10,000	182,000	12,015,000	*a*	.1998	.1877	.1997	.0120	.0001
			b	.1996	.1874	.1994	.0120	.0002
			c	.1997	.1875	.1993	.0118	.0004
10,000	189,100	12,204,100	*a*	.1999	.1878	.1996	.0118	.0003
			b	.1994	.1874	.1992	.0118	.0002
			c	.1998	.1875	.1994	.0119	.0004
10,000	189,900	12,394,000	*a*	.2001	.1877	.1996	.0119	.0005
			b	.1996	.1874	.1993	.0119	.0003
			c	.1997	.1876	.1994	.0118	.0003
10,000	192,500	12,586,500	*a*	.1999	.1878	.1997	.0119	.0002
			b	.1997	.1874	.1993	.0119	.0004
			c	.1997	.1877	.1995	.0118	.0002
10,000	177,600	12,764,100	*a*	.2000	.1878	.1997	.0119	.0003
			b	.1996	.1874	.1994	.0120	.0002
			c	.1997	.1875	.1994	.0119	.0003
10,000	179,400	12,943,500	*a*	.1999	.1877	.1997	.0120	.0002
			b	.1995	.1874	.1994	.0120	.0001
			c	.1998	.1877	.1994	.0117	.0004
10,000	185,600	13,129,100	*a*	.1999	.1878	.1996	.0118	.0003
			b	.1995	.1874	.1993	.0119	.0002
			c	.1997	.1876	.1994	.0118	.0003
10,000	151,900	13,281,000	*a*	.1998	.1878	.1997	.0119	.0001
			b	.1995	.1875	.1993	.0118	.0002
			c	.1997	.1875	.1994	.0119	.0003
10,000	191,000	13,472,000	*a*	.1997	.1878	.1997	.0119	0.
			b	.1995	.1874	.1993	.0119	.0002
			c	.1998	.1875	.1994	.0119	.0004

No. 27.—Cast (Gun) Iron Bar, No. 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
10, 000	188, 000	13, 660, 000	*a*	.1997	.1879	.1997	.0118	0.
			b	.1996	.1874	.1993	.0119	.0003
			c	.1997	.1875	.1994	.0119	.0003
10, 000	188, 000	13, 848, 000	*a*	.1999	.1879	.1997	.0118	.0002
			b	.1995	.1875	.1993	.0118	.0002
			c	.1997	.1877	.1995	.0118	.0002
10, 000	185, 500	14, 033, 500	*a*	.2001	.1878	.1997	.0119	.0004
			b	.1998	.1875	.1993	.0118	.0005
			c	.1997	.1877	.1994	.0117	.0003
10, 000	188, 500	14, 222, 000	*a*	.2000	.1878	.1997	.0119	.0003
			b	.1995	.1875	.1993	.0118	.0002
			c	.1997	.1877	.1994	.0117	.0003
10, 000	184, 000	14, 406, 000	*a*	.2000	.1879	.1997	.0118	.0003
			b	.1996	.1876	.1994	.0118	.0002
			c	.1997	.1876	.1994	.0118	.0003
10, 000	190, 000	14, 596, 000	*a*	.1999	.1879	.1997	.0118	.0002
			b	.1996	.1876	.1993	.0117	.0003
			c	.1998	.1876	.1994	.0118	.0004
10, 000	189, 500	14, 785, 500	*a*	.1997	.1877	.1996	.0119	.0001
			b	.1997	.1874	.1994	.0120	.0003
			c	.1998	.1877	.1994	.0117	.0004
10, 000	186, 500	14, 972, 000	*a*	.2000	.1878	.1998	.0120	.0002
			b	.1996	.1875	.1993	.0118	.0003
			c	.1997	.1876	.1994	.0118	.0003
10, 000	183, 200	15, 155, 200	*a*	.1998	.1877	.1997	.0120	.0001
			b	.1996	.1874	.1993	.0119	.0003
			c	.1997	.1875	.1993	.0118	.0004
10, 000	190, 800	15, 346, 000	*a*	.2000	.1878	.1997	.0119	.0003
			b	.1997	.1874	.1993	.0119	.0004
			c	.1997	.1875	.1995	.0120	.0002
10, 000	190, 000	15, 536, 000	*a*	.2001	.1878	.1997	.0119	.0004
			b	.1996	.1874	.1993	.0119	.0003
			c	.1998	.1876	.1995	.0119	.0003
10, 000	149, 000	15, 685, 000	*a*	.1997	.1876	.1997	.0121	0.
			b	.1997	.1874	.1995	.0121	.0002
			c	.1998	.1876	.1995	.0119	.0003
10, 000	186, 100	15, 871, 100	*a*	.1999	.1878	.1998	.0120	.0001
			b	.1997	.1874	.1993	.0119	.0004
			c	.1998	.1877	.1997	.0120	.0001
10, 000	188, 900	16, 060, 000	*a*	.2000	.1879	.1997	.0118	.0003
			b	.1998	.1875	.1995	.0120	.0003
			c	.1998	.1876	.1995	.0119	.0003
10, 000	191, 000	16. 251, 000	*a*	.1998	.1878	.1997	.0119	.0001
			b	.1997	.1876	.1994	.0118	.0003
			c	.1998	.1878	.1996	.0118	.0002
10, 000	150, 000	16, 401, 000	*a*	.2001	.1880	.1997	.0117	.0004
			b	.1997	.1877	.1994	.0117	.0003
			c	.1998	.1879	.1995	.0116	.0003
10, 000	191, 000	16, 592, 000	*a*	.1998	.1880	.1998	.0118	0.
			b	.1997	.1878	.1994	.0116	.0003
			c	.1998	.1879	.1995	.0116	.0003
10, 000	177, 000	16, 769, 000	*a*	.1998	.1878	.1997	.0119	.0001
			b	.1998	.1876	.1994	.0118	.0004
			c	.1998	.1878	.1995	.0117	.0003
10, 000	192, 000	16, 961, 000	*a*	.1999	.1878	.1997	.0119	.0002
			b	.1997	.1874	.1994	.0120	.0003
			c	.1999	.1877	.1995	.0118	.0004

No. 27.—Cast (Gun) Iron Bar, No. 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
10,000	179,000	17,140,000	*a*	.1999	.1879	.1998	.0119	.0001
			b	.1995	.1875	.1993	.0118	.0002
			c	.1999	.1876	.1995	.0119	.0004
10,000	189,000	17,329,000	*a*	.1998	.1878	.1997	.0119	.0001
			b	.1997	.1874	.1993	.0119	.0004
			c	.1998	.1876	.1995	.0119	.0003
10,000	177,000	17,506,000	*a*	.1999	.1878	.1997	.0119	.0002
			b	.1996	.1874	.1992	.0118	.0004
			c	.1997	.1876	.1995	.0119	.0002
10,000	160,000	17,666,000	*a*	.2000	.1878	.1997	.0119	.0003
			b	.1995	.1874	.1993	.0119	.0002
			c	.1998	.1876	.1995	.0119	.0003
10,000	190,000	17,856,000	*a*	.2001	.1878	.1997	.0119	.0004
			b	.1995	.1875	.1993	.0118	.0002
			c	.1997	.1876	.1995	.0119	.0002
10,000	143,800	17,999,800	*a*	.2001	.1878	.1998	.0120	.0003
			b	.1996	.1874	.1993	.0119	.0003
			c	.1997	.1876	.1994	.0118	.0003
10,000	190,700	18,190,500	*a*	.1998	.1877	.1997	.0120	.0001
			b	.1995	.1874	.1993	.0119	.0002
			c	.1998	.1877	.1995	.0118	.0003
10,000	191,500	18,382,000	*a*	.2001	.1878	.1997	.0119	.0004
			b	.1996	.1875	.1993	.0118	.0003
			c	.1998	.1876	.1995	.0119	.0003
10,000	191,000	18,573,000	*a*	.1999	.1879	.1996	.0117	.0003
			b	.1995	.1875	.1993	.0118	.0002
			c	.1998	.1877	.1995	.0118	.0003
10,000	193,000	18,766,000	*a*	.1997	.1878	.1997	.0119	0.
			b	.1995	.1875	.1993	.0118	.0002
			c	.1998	.1878	.1995	.0117	.0003
10,000	192,000	18,958,000	*a*	.2001	.1879	.1997	.0118	.0004
			b	.1995	.1874	.1993	.0119	.0002
			c	.1998	.1875	.1995	.0120	.0003
10,000	192,500	19,150,500	*a*	.1998	.1878	.1997	.0119	.0001
			b	.1997	.1874	.1993	.0119	.0004
			c	.1998	.1877	.1995	.0118	.0003
10,000	182,000	19,332,500	*a*	.1997	.1878	.1997	.0119	0.
			b	.1996	.1874	.1993	.0119	.0003
			c	.1998	.1876	.1995	.0119	.0003
10,000	193,500	19,526,000	*a*	.1999	.1878	.1998	.0120	.0001
			b	.1995	.1874	.1994	.0120	.0001
			c	.1998	.1877	.1994	.0117	.0004
10,000	187,200	19,713,200	*a*	.1999	.1878	.1998	.0120	.0001
			b	.1996	.1875	.1993	.0118	.0003
			c	.1998	.1876	.1995	.0119	.0003
10,000	193,900	19,907,100	*a*	.1999	.1878	.1998	.0120	.0001
			b	.1995	.1874	.1993	.0119	.0002
			c	.1998	.1877	.1995	.0118	.0003
10,000	187,900	20,095,000	*a*	.1998	.1879	.1997	.0118	.0001
			b	.1996	.1875	.1994	.0119	.0002
			c	.1998	.1875	.1994	.0119	.0004
10,000	177,000	20,272,000	*a*	.2000	.1879	.1997	.0118	.0003
			b	.1996	.1875	.1994	.0119	.0002
			c	.1998	.1876	.1995	.0119	.0003
10,000	190,000	20,462,000	*a*	.2000	.1878	.1997	.0119	.0003
			b	.1997	.1874	.1994	.0120	.0003
			c	.1998	.1877	.1995	.0118	.0003
10,000	190,500	20,652,500	*a*	.1998	.1879	.1997	.0118	.0001
			b	.1996	.1875	.1993	.0118	.0003
			c	.1999	.1877	.1995	.0118	.0004

Bar removed from machine and afterward ruptured by tensile test.

No. 28.—Cast (Gun) Iron Bar, No. 2.

Diameter, 1″. Speed of rotation, 400 per minute.
Length between end bearings, 33″.
Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
25,000	0	0	*a*	.1991	.1641	.1955	.0314	.0036
			b	.2014	.1657	.1965	.0308	.0049
			c	.2022	.1658	.1968	.0310	.0054
25,000	4,700	4,700	Bar ruptured.					

No. 29.—Cast (Gun) Iron Bar, No. 3.

Diameter, 1″. Speed of rotation, 400 per minute.
Length between end bearings, 33″.
Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
20,000	0	0	*a*	.1989	.1716	.1965	.0249	.0024
			b	.2009	.1728	.1979	.0251	.0030
			c	.2012	.1730	.1981	.0251	.0031
20,000	25,000	25,000	*a*	.1996	.1700	.1980	.0280	.0016
			b	.2000	.1703	.1981	.0278	.0019
			c	.2000	.1695	.1980	.0285	.0020
20,000	1,400	26,400	Bar ruptured.					

No. 30.—Cast (Gun) Iron Bar, No. 4.

Diameter, 1″. Speed of rotation, 400 per minute.
Length between end bearings, 33″.
Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
15, 000	0	0	*a*	.1989	.1793	.1976	.0183	.0013
			b	.1991	.1795	.1977	.0182	.0014
			c	.1992	.1794	.1975	.0181	.0017
15, 000	25, 000	25, 000	*a*	.1989	.1795	.1982	.0187	.0007
			b	.1986	.1793	.1980	.0187	.0006
			c	.1986	.1790	.1977	.0187	.0009
15, 000	25, 000	50, 000	*a*	.1992	.1794	.1983	.0189	.0009
			b	.1989	.1792	.1980	.0188	.0009
			c	.1985	.1790	.1977	.0187	.0008
15, 000	25, 000	75, 000	*a*	.1988	.1795	.1982	.0187	.0006
			b	.1986	.1794	.1981	.0187	.0005
			c	.1987	.1789	.1977	.0188	.0010
15, 000	25, 000	100, 000	*a*	.1984	.1795	.1983	.0188	.0001
			b	.1990	.1794	.1981	.0187	.0009
			c	.1987	.1789	.1978	.0189	.0009
15, 000	25, 000	125, 000	*a*	.1988	.1795	.1982	.0187	.0006
			b	.1990	.1793	.1981	.0188	.0009
			c	.1985	.1791	.1978	.0187	.0007
15, 000	25, 000	150, 000	*a*	.1985	.1794	.1982	.0188	.0003
			b	.1987	.1793	.1980	.0187	.0007
			c	.1987	.1789	.1978	.0189	.0009
15, 000	25, 000	175, 000	*a*	.1989	.1794	.1983	.0189	.0006
			b	.1990	.1793	.1981	.0188	.0009
			c	.1985	.1790	.1978	.0188	.0007
15, 000	25, 000	200, 000	*a*	.1992	.1795	.1984	.0189	.0008
			b	.1987	.1793	.1981	.0188	.0006
			c	.1986	.1789	.1978	.0189	.0008
15, 000	25, 000	225, 000	*a*	.1990	.1794	.1983	.0189	.0007
			b	.1990	.1793	.1981	.0188	.0009
			c	.1985	.1789	.1978	.0189	.0007
15, 000	25, 000	250, 000	*a*	.1993	.1794	.1984	.0190	.0009
			b	.1990	.1793	.1982	.0189	.0008
			c	.1985	.1787	.1978	.0191	.0007
15, 000	25, 000	275, 000	*a*	.1992	.1794	.1983	.0189	.0009
			b	.1989	.1792	.1981	.0189	.0008
			c	.1986	.1790	.1979	.0189	.0007
15, 000	25, 000	300, 000	*a*	.1984	.1794	.1983	.0189	.0001
			b	.1988	.1793	.1982	.0189	.0006
			c	.1987	.1789	.1978	.0189	.0009
15, 000	50, 000	350, 000	*a*	.1984	.1789	.1978	.0189	.0006
			b	.1983	.1787	.1977	.0190	.0006
			c	.1983	.1784	.1974	.0190	.0009
15, 000	50, 000	400, 000	*a*	.1984	.1789	.1978	.0189	.0006
			b	.1983	.1788	.1977	.0189	.0006
			c	.1983	.1784	.1974	.0190	.0009
15, 000	50, 000	450, 000	*a*	.1985	.1790	.1978	.0188	.0007
			b	.1987	.1789	.1978	.0189	.0009
			c	.1981	.1784	.1974	.0190	.0007
15, 000	50, 000	500, 000	*a*	.1980	.1789	.1978	.0189	.0002
			b	.1985	.1786	.1977	.0191	.0008
			c	.1982	.1784	.1974	.0190	.0008

No 30.—Cast (Gun) Iron Bar, No. 4—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
15, 000	50, 000	550, 000	*a*	.1987	.1789	.1979	.0190	.0008
			b	.1985	.1788	.1978	.0190	.0007
			c	.1981	.1785	.1974	.0189	.0007
15, 000	50, 000	600, 000	*a*	.1984	.1790	.1979	.0189	.0005
			b	.1985	.1789	.1978	.0189	.0007
			c	.1981	.1784	.1974	.0190	.0007
15, 000	50, 000	650, 000	*a*	.1985	.1789	.1979	.0190	.0006
			b	.1983	.1788	.1977	.0189	.0006
			c	.1982	.1784	.1974	.0190	.0008
15, 000	50, 000	700, 000	*a*	.1984	.1790	.1979	.0189	.0005
			b	.1986	.1788	.1978	.0190	.0008
			c	.1982	.1783	.1974	.0191	.0008
15, 000	50, 000	750, 000	*a*	.1983	.1789	.1979	.0190	.0004
			b	.1983	.1788	.1978	.0190	.0005
			c	.1983	.1783	.1974	.0191	.0009
15, 000	226, 500	976, 500	*a*	.1985	.1789	.1979	.0190	.0006
			b	.1986	.1787	.1978	.0191	.0008
			c	.1981	.1784	.1974	.0190	.0007
15, 000	177, 500	1, 154, 000	*a*	.1980	.1788	.1978	.0190	.0002
			b	.1985	.1788	.1978	.0190	.0007
			c	.1983	.1784	.1974	.0190	.0009
15, 000	189, 500	1, 343, 500	*a*	.1988	.1788	.1980	.0192	.0008
			b	.1986	.1788	.1978	.0190	.0008
			c	.1981	.1784	.1974	.0190	.0007
15, 000	189, 500	1, 533, 000	*a*	.1986	.1789	.1979	.0190	.0007
			b	.1985	.1788	.1978	.0190	.0008
			c	.1980	.1786	.1974	.0188	.0006
15, 000	191, 000	1, 724, 000	*a*	.1988	.1790	.1980	.0190	.0008
			b	.1986	.1789	.1977	.0188	.0009
			c	.1982	.1787	.1974	.0187	.0008
15, 000	193, 000	1, 917, 000	*a*	.1987	.1790	.1979	.0189	.0008
			b	.1986	.1788	.1978	.0190	.0008
			c	.1982	.1786	.1974	.0188	.0008
15, 000	183, 400	2, 100, 400	*a*	.1988	.1791	.1980	.0189	.0008
			b	.1986	.1789	.1979	.0190	.0007
			c	.1981	.1785	.1974	.0189	.0007
15, 000	187, 600	2, 288, 000	*a*	.1988	.1790	.1980	.0190	.0008
			b	.1984	.1788	.1979	.0191	.0005
			c	.1982	.1784	.1974	.0190	.0008
15, 000	194, 000	2, 482, 000	*a*	.1982	.1790	.1980	.0190	.0002
			b	.1986	.1789	.1978	.0189	.0008
			c	.1982	.1785	.1975	.0190	.0007
15, 000	195, 000	2, 677, 000	*a*	.1988	.1792	.1981	.0189	.0007
			b	.1986	.1791	.1978	.0187	.0008
			c	.1982	.1787	.1974	.0187	.0008
15, 000	181, 000	2, 858, 000	*a*	.1983	.1791	.1979	.0188	.0004
			b	.1984	.1790	.1979	.0189	.0005
			c	.1982	.1785	.1974	.0189	.0008
15, 000	189, 000	3, 047, 000	*a*	.1985	.1792	.1980	.0188	.0005
			b	.1984	.1790	.1978	.0188	.0006
			c	.1982	.1787	.1974	.0187	.0008
15, 000	190, 000	3, 237, 000	*a*	.1989	.1790	.1981	.0191	.0008
			b	.1986	.1792	.1979	.0187	.0007
			c	.1981	.1785	.1975	.0190	.0006
15, 000	190, 000	3, 427, 000	*a*	.1984	.1790	.1980	.0190	.0004
			b	.1987	.1790	.1979	.0189	.0008
			c	.1981	.1785	.1974	.0189	.0007

No. 30.—Cast (Gun) Iron Bar, No. 4—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
15, 000	193, 000	3, 620, 000	*a*	.1986	.1790	.1980	.0190	.0006
			b	.1985	.1790	.1979	.0189	.0006
			c	.1982	.1786	.1975	.0189	.0007
15, 000	193, 000	3, 813, 000	*a*	.1982	.1790	.1979	.0189	.0003
			b	.1986	.1792	.1979	.0187	.0007
			c	.1983	.1786	.1975	.0189	.0008
15, 000	187, 000	4, 00[illegible]000	*a*	.1988	.1790	.1981	.0191	.0007
			b	.1987	.1790	.1980	.0190	.0007
			c	.1982	.1784	.1975	.0191	.0007
15, 000	194, 000	4, 194, 000	*a*	.1987	.1792	.1980	.0188	.0007
			b	.1984	.1788	.1978	.0190	.0006
			c	.1983	.1787	.1975	.0188	.0008
15, 000	86, 000	4, 280, 000	*a*	.1986	.1792	.1982	.0190	.0004
			b	.1984	.1789	.1979	.0190	.0005
			c	.1983	.1788	.1975	.0187	.0008
15, 000	176, 000	4, 456, 000	*a*	.1985	.1790	.1980	.0190	.0005
			b	.1984	.1789	.1978	.0189	.0006
			c	.1984	.1784	.1975	.0191	.0009
15, 000	191, 000	4, 647, 000	*a*	.1983	.1789	.1982	.0193	.0001
			b	.1984	.1790	.1979	.0189	.0005
			c	.1983	.1787	.1975	.0188	.0008
15, 000	186, 000	4, 833, 000	*a*	.1984	.1790	.1981	.0191	.0003
			b	.1985	.1793	.1979	.0186	.0006
			c	.1983	.1788	.1974	.0186	.0009
15, 000	192, 000	5, 025, 000	*a*	.1988	.1793	.1982	.0189	.0006
			b	.1985	.1791	.1979	.0188	.0006
			c	.1983	.1786	.1975	.0189	.0008
15, 000	192, 500	5, 217, 500	*a*	.1990	.1795	.1982	.0187	.0008
			b	.1988	.1796	.1983	.0187	.0005
			c	.1984	.1791	.1976	.0185	.0008
15, 000	193, 500	5, 411, 000	*a*	.1987	.1793	.1983	.0190	.0004
			b	.1990	.1793	.1983	.0190	.0007
			c	.1984	.1789	.1978	.0189	.0006
15, 000	175, 000	5, 586, 000	*a*	.1993	.1799	.1985	.0186	.0008
			b	.1992	.1796	.1985	.0189	.0007
			c	.1986	.1790	.1979	.0189	.0007
15, 000	194, 000	5, 780, 000	*a*	.1990	.1795	.1982	.0187	.0008
			b	.1990	.1794	.1983	.0189	.0007
			c	.1984	.1790	.1977	.0187	.0007
15, 000	192, 000	5, 972, 000	*a*	.1983	.1794	.1982	.0188	.0001
			b	.1989	.1794	.1983	.0189	.0006
			c	.1985	.1790	.1977	.0187	.0008
15, 000	185, 000	6, 157, 000	*a*	.1985	.1795	.1983	.0188	.0002
			b	.1992	.1795	.1984	.0189	.0008
			c	.1985	.1790	.1978	.0188	.0007
15, 000	109, 000	6, 266, 000	....	....	....	....	....	....
			Bar rested 36 hours.					
15, 000	0	6, 266, 000	*a*	.1985	.1794	.1983	.0189	.0002
			b	.1990	.1794	.1984	.0190	.0006
			c	.1987	.1789	.1978	.0189	.0009
15, 000	167, 000	6, 433, 000	*a*	.1992	.1795	.1984	.0189	.0008
			b	.1990	.1795	.1984	.0189	.0006
			c	.1985	.1791	.1978	.0187	.0007
15, 000	191, 000	6, 624, 000	*a*	.1990	.1793	.1983	.0190	.0007
			b	.1991	.1793	.1983	.0190	.0008
			c	.1984	.1789	.1978	.0189	.0006

No. 30.—Cast (Gun) Iron Bar, No. 4—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
15, 000	183, 000	6, 807, 000	*a*	.1984	.1795	.1982	.0187	.0002
			b	.1990	.1797	.1983	.0186	.0007
			c	.1986	.1791	.1978	.0187	.0008
15, 000	189, 100	6, 996, 100	*a*	.1984	.1796	.1983	.0187	.0001
			b	.1990	.1798	.1984	.0186	.0006
			c	.1987	.1789	.1979	.0190	.0008
15, 000	199, 300	7, 195, 400	....	....	....	....	....	....
Bar rested 15 hours.								
15, 000	0	7, 195, 400	*a*	.1987	.1767	.1984	.0187	.0003
			b	.1990	.1797	.1984	.0187	.0006
			c	.1987	.1790	.1979	.0189	.0008
15, 000	184, 600	7, 380, 000	*a*	.1988	.1794	.1984	.0190	.0004
			b	.1988	.1794	.1984	.0190	.0004
			c	.1986	.1790	.1978	.0188	.0008
15, 000	190, 000	7, 570, 000	*a*	.1991	.1793	.1984	.0191	.0007
			b	.1990	.1795	.1984	.0189	.0006
			c	.1986	.1789	.1979	.0190	.0007
15, 000	187, 000	7, 757, 000	*a*	.1986	.1795	.1983	.0188	.0003
			b	.1991	.1797	.1984	.0187	.0007
			c	.1985	.1789	.1979	.0190	.0006
15, 000	181, 500	7, 938, 500	*a*	.1992	.1795	.1984	.0189	.0008
			b	.1990	.1793	.1984	.0191	.0006
			c	.1985	.1790	.1978	.0188	.0007
15, 000	194, 000	8, 132, 500	*a*	.1985	.1793	.1984	.0191	.0001
			b	.1992	.1795	.1984	.0189	.0008
			c	.1987	.1790	.1979	.0189	.0008
15, 000	162, 500	8, 295, 000	*a*	.1993	.1793	.1984	.0191	.0009
			b	.1990	.1795	.1984	.0189	.0006
			c	.1985	.1791	.1979	.0188	.0006
15, 000	175, 000	8, 470, 000	*a*	.1992	.1794	.1984	.0190	.0008
			b	.1989	.1796	.1984	.0188	.0005
			c	.1986	.1790	.1978	.0188	.0008
15, 000	92, 870	8, 562, 870	....	....	....	....	....	....
Bar rested 12 hours.								
15, 000	0	8, 562, 870	*a*	.1992	.1794	.1984	.0190	.0008
			b	.1990	.1795	.1985	.0190	.0005
			c	.1986	.1790	.1979	.0189	.0007
15, 000	62, 230	8, 625, 100	....	....	....	....	....	....
Bar rested 12 hours.								
15, 000	0	8, 625, 100	*a*	.1985	.1796	.1983	.0187	.0002
			b	.1900	.1797	.1985	.0188	.0005
			c	.1988	.1790	.1979	.0189	.0009
15, 000	177, 100	8, 802, 200	*a*	.1985	.1793	.1984	.0191	.0001
			b	.1988	.1797	.1985	.0188	.0003
			c	.1987	.1790	.1979	.0189	.0008
15, 000	168, 800	8, 971, 000	*a*	.1993	.1794	.1984	.0190	.0009
			b	.1993	.1795	.1985	.0190	.0008
			c	.1987	.1790	.1979	.0189	.0008
15, 000	174, 500	9, 145, 500	*a*	.1986	.1793	.1984	.0191	.0002
			b	.1992	.1794	.1985	.0191	.0007
			c	.1987	.1789	.1980	.0191	.0007
15, 000	180, 500	9, 326, 000	*a*	.1993	.1794	.1985	.0191	.0008
			b	.1992	.1795	.1985	.0190	.0007
			c	.1987	.1790	.1980	.0190	.0007

No. 30.—Cast (Gun) Iron Bar, No. 4—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.		
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
15, 000	177, 500	9, 503, 500	*a*	.1986	.1793	.1984	.0191	.0002
			b	.1990	.1797	.1984	.0187	.0006
			c	.1986	.1790	.1978	.0188	.0008
15, 000	179, 500	9, 683, 000	*a*	.1988	.1794	.1985	.0191	.0003
			b	.1990	.1795	.1985	.0190	.0005
			c	.1986	.1788	.1980	.0192	.0006
15, 000	177, 000	9, 860, 000	*a*	.1989	.1794	.1985	.0191	.0004
			b	.1990	.1795	.1985	.0190	.0005
			c	.1988	.1788	.1980	.0192	.0008
15, 000	186, 150	10, 046, 150	....	....	....	....	....	....
Bar rested 12 hours.								
15, 000	0	10, 046, 150	*a*	.1993	.1797	.1985	.0188	.0008
			b	.1992	.1797	.1985	.0188	.0007
			c	.1986	.1792	.1979	.0187	.0007
15, 000	158, 150	10, 205, 000	*a*	.1993	.1795	.1984	.0189	.0009
			b	.1992	.1798	.1985	.0187	.0007
			c	.1986	.1790	.1980	.0190	.0006
15, 000	179, 500	10, 384, 500	*a*	.1990	.1795	.1985	.0190	.0005
			b	.1990	.1796	.1984	.0188	.0006
			c	.1987	.1790	.1979	.0189	.0008
15, 000	181, 500	10, 566, 000	*a*	.1993	.1794	.1984	.0190	.0009
			b	.1992	.1795	.1984	.0189	.0008
			c	.1986	.1789	.1979	.0190	.0007
15, 000	180, 000	10, 746, 000	*a*	.1991	.1794	.1984	.0190	.0007
			b	.1992	.1793	.1984	.0191	.0008
			c	.1985	.1790	.1978	.0188	.0007
Bar still under test.								

ENDURANCE TESTS OF ROTATING SHAFTS.

SUMMARIZED TABULATION.

No. of test.	Material.	Marks.	Speed of rotation per minute.	Maximum fiber stress per square inch.	Number of rotations.		Remarks.
					Successive.	Total.	
				Pounds.			
23	O. H. steel	6–797	800	20, 000	50, 000	50, 000	
				30, 000	100, 000	150, 000	
				40, 000	8, 168, 500	8, 318, 500	Bar ruptured.
24	O. H. steel	9–756	400	50, 000	....	1, 769, 000	Do.
25	O. H. steel	10–334	1, 350	30, 000	10, 000	10, 000	
				35, 000	10, 000	20, 000	
				40, 000	10, 000	30, 000	
				45, 000	10, 000	40, 000	
				50, 000	40, 000	80, 000	
	Bar removed from machine and allowed to rest 48 days.						
			400	40, 000	10, 000, 000	10, 080, 000	Removed from machine.
26	O. H. steel	4	400	20, 000	951, 100	951, 100	
				25, 000	100, 000	1, 051, 100	
				30, 000	238, 900	1, 290, 000	
				35, 000	100, 000	1, 390, 000	
				40, 000	200, 000	1, 590, 000	
				45, 000	1, 064, 200	2, 654, 200	Bar ruptured.
27	Cast (gun) iron	1	400	10, 000	20, 652, 500	20, 652, 500	Bar removed from machine and afterward ruptured by tensile test.
28	Cast (gun) iron	2	400	25, 000	4, 700	4, 700	Bar ruptured.
29	Cast (gun) iron	3	400	20, 000	26, 400	26, 400	Do.
30	Cast (gun) iron	4	400	15, 000	10, 746, 000	10, 746, 000	Bar still under test.

CAST-IRON.

SAND AND CHILLED CASTINGS.

MODULUS OF ELASTICITY UNDER COMPRESSION LOADS.

No. 2770.

SAND CASTING.

Length, 12″.97.
Diameter, 3″.
Sectional area, 7.069 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
7, 069	1, 000	0.	0.	Initial load.
35, 345	5, 000	.0026	.0002	
70, 690	10, 000	.0063	.0007	
106, 035	15, 000	.0099	.0011	
141, 380	20, 000	.0135	.0015	
176, 725	25, 000	.0174	.0022	E=15,284,000 pounds.
212, 070	30, 000	.0222	.0037	
247, 415	35, 000	.0279	.0061	
282, 760	40, 000	.0359	.0106	
35, 345	5, 000	.0131	....	
70, 690	10, 000	.0162	....	
106, 035	15, 000	.0193	....	
141, 380	20, 000	.0224	....	
176, 725	25, 000	.0256	....	
212, 070	30, 000	.0289	....	
247, 415	35, 000	.0323	....	
212, 070	30, 000	.0295	....	
176, 725	25, 000	.0264	....	
141, 380	20, 000	.0234	....	
106, 035	15, 000	.0205	....	
70, 690	10, 000	.0172	....	
35, 345	5, 000	.0136	.0108	
282, 760	40, 000	.0362	....	
318, 105	45, 000	.0470	....	
353, 450	50, 000	.0651	....	
318, 105	45, 000	.0626	....	
282, 760	40, 000	.0596	....	
247, 415	35, 000	.0569	....	
212, 070	30, 000	.0538	....	
176, 725	25, 000	.0507	....	
141, 380	20, 000	.0475	....	
106, 035	15, 000	.0442	....	
70, 690	10, 000	.0404	....	
35, 345	5, 000	.0363	.0327	
35, 345	5, 000	.0349	....	
70, 690	10, 000	.0380	....	
106, 035	15, 000	.0412	....	
141, 380	20, 000	.0444	....	
176, 725	25, 000	.0474	....	
212, 070	30, 000	.0506	....	
247, 415	35, 000	.0539	....	
282, 760	40, 000	.0574	....	
318, 105	45, 000	.0611	....	
353, 450	50, 000	.0667	....	
388, 795	55, 000	.0888	....	
424, 140	60, 000	.1172	....	
388, 795	55, 000	.1148	....	
353, 450	50, 000	.1121	....	
318, 105	45, 000	.1093	....	
282, 760	40, 000	.1064	....	
247, 415	35, 000	.1033	....	
212, 070	30, 000	.1002	....	
176, 725	25, 000	.0970	....	
141, 380	20, 000	.0936	....	
106, 035	15, 000	.0899	....	
70, 690	10, 000	.0858	....	
35, 345	5, 000	.0813	.0772	
7, 069	1, 000	....	.0768	After 3 minutes.
7, 069	1, 000	....	.0765	After 1 hour.
35, 345	5, 000	.0788	....	
70, 690	10, 000	.0820	....	
106, 035	15, 000	.0851	....	
141, 380	20, 000	.0882	....	
176, 725	25, 000	.0914	....	
212, 070	30, 000	.0947	....	
247, 415	35, 000	.0978	....	

No. 2770—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
282, 760	40, 000	.1012	....	
247, 415	35, 000	.0985	....	
212, 070	30, 000	.0957	....	
176, 725	25, 000	.0929	....	
141, 380	20, 000	.0899	....	
106, 035	15, 000	.0867	....	
70, 690	10, 000	.0835	....	
35, 345	5, 000	.0800	.0770	
35, 345	5, 000	.0792	....	
70, 690	10, 000	.0823	....	
35, 345	5, 000	.0793	.0769	

No. 2778.

CHILLED CASTING.

Length, 11″.57.
Diameter, 2″.95.
Sectional area, 6.83 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
6, 830	1, 000	0.	0.	Initial load.
34, 150	5, 000	.0022	.0001	E=19,231,000 pounds.
68, 300	10, 000	.0050	.0002	
102, 450	15, 000	.0079	.0004	
136, 600	20, 000	.0107	.0006	
170, 750	25, 000	.0134	.0007	
204, 900	30, 000	.0163	.0008	
239, 050	35, 000	.0190	.0010	
273, 200	40, 000	.0217	.0012	
34, 150	5, 000	.0033	....	
68, 300	10, 000	.0060	....	
102, 450	15, 000	.0087	....	
136, 600	20, 000	.0113	....	
170, 750	25, 000	.0140	....	
204, 900	30, 000	.0166	....	
239, 050	35, 000	.0192	....	
204, 900	30, 000	.0167	....	
170, 750	25, 000	.0142	....	
136, 600	20, 000	.0117	....	
102, 450	15, 000	.0090	....	
68, 300	10, 000	.0064	....	
34, 150	5, 000	.0035	.0012	
273, 200	40, 000	.0217	....	
307, 350	45, 000	.0245	....	
341, 500	50, 000	.0275	....	
307, 350	45, 000	.0252	....	
273, 200	40, 000	.0227	....	
239, 050	35, 000	.0202	....	
204, 900	30, 000	.0177	....	
170, 750	25, 000	.0152	....	
136, 600	20, 000	.0125	....	
102, 450	15, 000	.0099	....	
68, 300	10, 000	.0072	....	
34, 150	5, 000	.0042	.0018	
34, 150	5, 000	.0039	....	
68, 300	10, 000	.0067	....	
102, 450	15, 000	.0095	....	
136, 600	20, 000	.0120	....	
170, 750	25, 000	.0147	....	
204, 900	30, 000	.0172	....	
239, 050	35, 000	.0198	....	
273, 200	40, 000	.0223	....	
307, 350	45, 000	.0249	....	
341, 500	50, 000	.0277	....	
375, 650	55, 000	.0307	....	
409, 800	60, 000	.0342	.0033	
443, 950	65, 000	.0383	.0048	
478, 100	70, 000	.0435	....	
	70, 000	.0444	....	After 5 minutes.
443, 950	65, 000	.0422	....	
409, 800	60, 000	.0397	....	
375, 650	55, 000	.0373	....	
341, 500	50, 000	.0349	....	
307, 350	45, 000	.0325	....	
273, 200	40, 000	.0299	....	
239, 050	35, 000	.0274	....	
204, 900	30, 000	.0248	....	
170, 750	25, 000	.0222	....	
136, 600	20, 000	.0194	....	
102, 450	15, 000	.0167	....	
68, 300	10, 000	.0138	....	
34, 150	5, 000	.0106	.0080	
	1, 000	....	.0079	After 5 minutes.
34, 150	5, 000	.0100	....	
68, 300	10, 000	.0127	....	
102, 450	15, 000	.0154	....	
136, 600	20, 000	.0182	....	

No. 2778—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
170,750	25,000	.0206	....	
204,900	30,000	.0232	....	
239,050	35,000	.0257	....	
273,200	40,000	.0284	....	
307,350	45,000	.0310	....	
341,500	50,000	.0337	....	
375,650	55,000	.0362	....	
409,800	60,000	.0390	....	
443,950	65,000	.0418	....	
478,100	70,000	.0449	....	
683,000	100,000	....	....	Maximum load applied. Micrometer not in position at the time.
6,830	1,000	....	.0648	Micrometer again in position.
68,300	10,000	.0690	....	
136,600	20,000	.0741	....	
204,900	30,000	.0793	....	
273,200	40,000	.0847	....	
341,500	50,000	.0900	....	
409,800	60,000	.0956	....	
478,100	70,000	.1015	....	
546,400	80,000	.1075	....	
478,100	70,000	.1029	....	
409,800	60,000	.0981	....	
341,500	50,000	.0932	....	
273,200	40,000	.0881	....	
204,900	30,000	.0827	....	
136,600	20,000	.0770	....	
68,300	10,000	.0710	.0650	
68,300	10,000	.0693	....	
		.0693	....	After 2 minutes.
136,600	20,000	.0743	....	
		.0744	....	After 2 minutes.
204,900	30,000	.0795	....	
		.0796	....	After 2 minutes.
273,200	40,000	.0848	....	
		.0849	....	After 2 minutes.
341,500	50,000	.0902	....	
		.0902	....	After 2 minutes.
409,800	60,000	.0957	....	
		.0957	....	After 2 minutes.
478,100	70,000	.1013	....	
		.1013	....	After 2 minutes.
546,400	80,000	.1072	....	
		.1073	....	After 2 minutes.
478,100	70,000	.1027	....	
		.1027	....	After 2 minutes.
409,800	60,000	.0979	....	
		.0980	....	After 2 minutes.
341,500	50,000	.0930	....	
		.0930	....	After 2 minutes.
273,200	40,000	.0879	....	
		.0879	....	After 2 minutes.
204,900	30,000	.0825	....	
		.0825	....	After 2 minutes.
136,600	20,000	.0768	....	
		.0768	....	After 2 minutes.
68,300	10,000	.0710	....	
		.0708	....	After 2 minutes.
6,830	1,000	....	.0650	
273,200	40,000	.0850	....	
136,600	20,000	.0750	.0650	Metal somewhat roughened on cylindrical surface near one end of the specimen.

No. 2895.

SAND CASTING.

Length, 12″.78.
Diameter, 4″.
Sectional area, 12.566 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
12,566	1,000	0.	0.	Initial load.
62,830	5,000	.0025	0002	E = 15,284,000 pounds.
125,660	10,000	.0060	.0005	
188,490	15,000	.0095	0010	
251,320	20,000	.0132	.0015	
314,150	25,000	.0173	.0024	
376,980	30,000	.0224	0042	
439,810	35,000	.0290	0074	
502,640	40,000	.0388	.0136	
565,470	45,000	.0532	.0245	
628,300	50,000	.0746	.0420	
	5,000	.0445	....	
	10,000	.0476	....	
	20,000	.0537	....	
	30,000	.0600	....	
	40,000	.0668	....	
	30,000	.0613	....	
	20,000	.0553	....	
	10,000	.0490	....	
	5,000	.0455	.0423	
691,130	55,000	.1026	.0662	
753,960	60,000	.1347	.0943	
	....	....	.0941	After 2 minutes.
	5,000	.0966	....	
	10,000	.0997	....	
	20,000	.1058	....	
	30,000	.1121	....	
	40,000	.1187	....	
	30,000	.1133	....	
	20,000	.1074	....	
	10,000	.1010	....	
	5,000	.0975	.0943	

Test discontinued.

No. 2896.

CHILLED CASTING.

Length, 11″.75.
Diameter, 3″.93.
Sectional area, 12.13 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
12, 130	1, 000	0.	0.	Initial load.
60, 650	5, 000	.0018	.0000	
121, 300	10, 000	.0047	.0002	
181, 950	15, 000	.0075	.0003	
242, 600	20, 000	.0103	.0003	
303, 250	25, 000	.0132	.0006	E = 18,519,000 pounds.
363, 900	30, 000	.0161	.0007	
424, 550	35, 000	.0189	.0009	
485, 200	40, 000	.0218	.0011	
545, 850	45, 000	.0249	.0014	
606, 500	50, 000	.0282	.0021	
	5, 000	.0041	....	
	10, 000	.0069	....	
	20, 000	.0122	....	
	30, 000	.0177	....	
	40, 000	.0229	....	
	30, 000	.0180	....	
	20, 000	.0127	....	
	10, 000	.0072	....	
	5, 000	.0043	.0020	
667, 150	55, 000	.0321	.0031	
277, 800	60, 000	.0366	.0048	
	5, 000	.0069	....	
	10, 000	.0098	....	
	20, 000	.0152	....	
	30, 000	.0206	....	
	40, 000	.0257	....	
	30, 000	.0210	....	
	20, 000	.0157	....	
	10, 000	.0102	....	
	5, 000	.0072	.0049	

Test discontinued.

No. 2897.

SAND CASTING.

Length, 12″.64.
Diameter, 2″.500.
Sectional area, 4.909 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,909	1,000	0.	0.	Initial load.
24,545	5,000	.0020	0.	E=17,073,000 pounds.
49,090	10,000	.0053	.0003	
73,635	15,000	.0085	.0006	
98,180	20,000	.0116	.0009	
122,725	25,000	.0150	.0012	
147,270	30,000	.0185	.0017	
171,815	35,000	.0216	.0024	
196,360	40,000	.0260	.0035	
220,905	45,000	.0315	.0058	
245,450	50,000	.0377	.0092	
269,995	55,000	.0470	.0150	
294,540	60,000	.0608	.0247	
545,000	111,020	....	....	Ultimate strength.

Fractured with a loud report into four principal fragments. A shearing fracture occurred near one end, the plane of fracture making an angle of 30° with the axis of the specimen, or 60° with the end surface of the specimen.

The metal on each side of this surface was perceptibly warmed at the time of rupture.

No. 2898.

CHILLED CASTING.

Length, 12″.03.
Diameter, 2″.46.
Sectional area, 4.753 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
4,753	1,000	0.	0.	Initial load.
23,765	5,000	.0021	0.	E=19,337,000 pounds.
47,530	10,000	.0047	.0002	
71,295	15,000	.0076	.0002	
95,060	20,000	.0104	.0003	
118,825	25,000	.0129	.0003	
142,590	30,000	.0153	.0003	
166,355	35,000	.0180	.0005	
190,120	40,000	.0208	.0006	
213,885	45,000	.0233	.0007	
237,650	50,000	.0262	.0009	
261,415	55,000	.0284	.0010	
285,180	60,000	.0313	.0014	
605,000	127,290	....	....	Ultimate strength.

Failed at the upper end of the casting with oblique shearing fractures.

The upper ends of the castings were not chilled, except at the circumference.

Depth of chill, ″.08 to ″.13.

No. 2899.

Sand Casting.

Length, 12″.58.
Diameter, 2″.
Sectional area, 3.1416 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,142	1,000	0.	0.	Initial load.
15,708	5,000	.0023	.0003	E = 17,767,000 pounds.
31,416	10,000	.0056	.0006	
47,124	15,000	.0087	.0010	
62,832	20,000	.0114	.0012	
78,540	25,000	.0150	.0016	
94,248	30,000	.0182	.0019	
109,956	35,000	.0216	.0026	
125,664	40,000	.0251	.0034	
141,372	45,000	.0302	.0054	
157,080	50,000	.0366	.0086	
172,788	55,000	.0454	.0130	
188,496	60,000	.0587	.0233	
322,500	102,650	....	....	Ultimate strength.

Failed by triple flexure.
Uniform gray granular fracture.

No. 2900.

Chilled Casting.

Length, 12″.20.
Diameter, 1″.96.
Sectional area, 3.017 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,017	1,000	0.	0.	Initial load.
15,085	5,000	.0020	0.	E = 19,886,000 pounds.
30,170	10,000	.0047	.0002	
45,255	15,000	.0074	.0003	
60,340	20,000	.0100	.0005	
75,425	25,000	.0126	.0005	
90,510	30,000	.0152	.0005	
105,595	35,000	.0177	.0006	
120,680	40,000	.0202	.0006	
135,765	45,000	.0227	.0008	
150,850	50,000	.0254	.0009	
165,935	55,000	.0279	.0010	
181,020	60,000	.0305	.0013	
419,100	138,910	....	....	Ultimate strength.

Surface (white chilled) metal flaked off 3″ from the top end of the casting, oblique fractures finally separating the metal.

Depth of chill, ″.12 to ″.20. Interior metal, hard, fine granular.

No. 2901.

SAND CASTING.

Length, 12″.79.
Diameter, 1″.505.
Sectional area, 1.779 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1, 734	975	0.	0.	Initial load.
8, 670	4, 875	.0022	0.	E=17,861,000 pounds.
17, 340	9, 750	.0052	.0004	
26, 010	14, 620	.0083	.0006	
34, 680	19, 490	.0115	.0010	
43, 350	24, 370	.0145	.0012	
52, 020	29, 240	.0178	.0017	
60, 690	34, 110	.0212	.0023	
69, 360	38, 990	.0250	.0037	
78, 030	43, 860	.0292	.0052	
86, 700	48, 735	.0345	.0070	
95, 370	53, 610	.0420	.0112	
104, 040	58, 480	.0520	.0178	
160, 200	90, 050	....	....	Ultimate strength.

Failed by triple flexure.
Uniform gray fracture.

No. 2902.

CHILLED CASTING.

Length, 12″.10.
Diameter, 1″.48.
Sectional area, 1.72 square inches.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
1, 720	1, 000	0.	0.	Initial load.
8, 600	5, 000	.0018	— .0001	E=20,468,000 pounds.
17, 200	10, 000	.0043	— .0001	
25, 800	15, 000	.0070	0.	
34, 400	20, 000	.0095	.0002	
43, 000	25, 000	.0120	.0002	
51, 600	30, 000	.0146	.0003	
60, 200	35, 000	.0170	.0003	
68, 800	40, 000	.0195	.0005	
77, 400	45, 000	.0219	.0005	
86, 000	50, 000	.0243	.0005	
94, 600	55, 000	.0267	.0007	
103, 200	60, 000	.0293	.0009	
229, 300	133, 310	....	....	Ultimate strength.

Failed by triple flexure, the metal flaking off the concave side at the middle, before final rupture.

White metal at the circumference ″.15 thickness; the center of bar a hard, gray, fine granular metal.

No. 2903.

SAND CASTING.

Length, 12″.60.
Diameter, 1″.007.
Sectional area, .797 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
797	1,000	0.	0.	Initial load.
3,985	5,000	.0022	0.	
7,970	10,000	.0052	.0001	
11,955	15,000	.0082	.0004	
15,940	20,000	.0117	.0007	E=17,857,000 pounds.
19,925	25,000	.0143	.0009	
23,910	30,000	.0175	.0013	
27,895	35,000	.0209	.0019	
31,880	40,000	.0244	.0026	
35,865	45,000	.0283	.0037	
39,850	50,000	.0333	.0057	
43,835	55,000	.0394	.0087	
47,820	60,000	.0477	.0140	
56,080	70,360	....	....	Ultimate strength.

Failed by triple flexure.

Uniform gray metal; coarser granulation than the corresponding chilled sample.

No. 2904.

CHILLED CASTING.

Length, 12″.40.
Diameter, ″.99.
Sectional area, .77 square inch.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
770	1,000	0.	0.	Initial load.
3,850	5,000	.0017	— .0001	
7,700	10,000	.0040	— .0001	
11,550	15,000	.0062	— .0001	
15,400	20,000	.0086	.0000	
19,250	25,000	.0110	.0000	E=21,875,000 pounds.
23,100	30,000	.0132	0.	Snapping sounds.
26,950	35,000	.0155	.0001	
30,800	40,000	.0180	.0002	
34,650	45,000	.0202	.0003	
38,500	50,000	.0226	.0005	
42,350	55,000	.0249	.0005	
46,200	60,000	.0271	....	
97,600	126,750	....	....	Ultimate strength.

Failed by deflecting, fracturing into eight pieces.

White iron to the depth of $\frac{1}{4}$″ from the circumference. The center hard gray iron, fine granular.

TABULATION OF CAST-IRON.

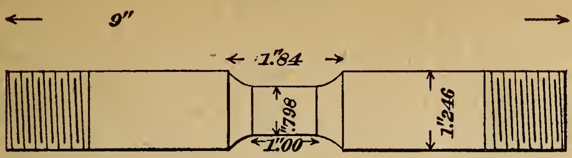
SAND AND CHILLED CASTINGS.

No. of test.	Kind of castings.	Total length.	Diameter.	Sectional area.	Gauged length.	Modulus of elasticity between 5,000 and 45,000 pounds per square inch.	Maximum load applied per square inch.	Ultimate strength per square inch.	Manner of failure.	Fracture.
		Inches.	*Inches.*	*Sq. in.*	*Inches.*	*Pounds per sq. inch.*	*Pounds.*	*Pounds.*		
2770	Sand........	12.97	3.00	7.069	10	15,284,000	60,000	....	Test discontinued	
2778	Chilled	11.57	2.95	6.83	10	19,231,000	100,000	....	....do	
2895	Sand........	12.78	4.00	12.566	10	15,284,000	60,000	....	....do	
2896	Chilled	11.75	3.93	12.13	10	18,519,000	60,000	....	....do	
2897	Sand........	12.64	2.50	4.909	10	17,073,000	....	111,020	Fractured with a loud report into four principal fragments.	
2898	Chilled	12.03	2.46	4.753	10	19,337,000	....	127,290	Shearing (oblique) fractures at the uppe r end of casting.	Depth of chill, ″.08, to ″.13.
2899	Sand........	12.58	2.00	3.1416	10	17,767,000	....	102,650	Triple flexure	Uniform gray, granular.
2900	Chilled	12.20	1.96	3.017	10	19,886,000	....	138,910	Oblique fractures................	Depth of chill ″.12 to ″.20; interior metal hard, fine granular.
2901	Sand.......	12.79	1.505	1.779	10	17,861,000	....	90,050	Triple flexure	Uniform gray.
2902	Chilled	12.10	1.48	1.72	10	20,468,000	....	133,310	....do	Depth of chill ″.15 center of bar hard, gray, fine granular.
2903	Sand........	12.60	1.007	.797	10	17,857,000	....	70,360	....do	Uniform gray, coarser granular than corresponding chilled casting.
2904	Chilled	12.40	.99	.77	10	21,875,000	....	126,750	Deflection, fracturing into eight pieces.	Depth of chill, ″.25; the center hard, gray, fine granular.

SHORT CYLINDRICAL AND GROOVED STEEL BARS.

SPECIMENS FROM BAR NO. 8, SECOND SERIES OF TEMPERATURE TESTS.

No. 2879.



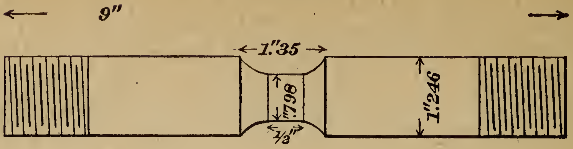
Marks, 8.
Diameter, ".798.
Sectional area, ".50.
Gauged length (covering stem and part of heads), 4".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	Initial load.
2, 500	5, 000	.0004	....	
5, 000	10, 000	.0008	....	
7, 500	15, 000	.0013	....	
10, 000	20, 000	.0018	0.	
12, 500	25, 000	.0022	0.	
15, 000	30, 000	.0027	0.	
17, 500	35, 000	.0032	0.	
20, 000	40, 000	.0036	0.	
22, 500	45, 000	.0041	0.	
25, 000	50, 000	.0046	0.	
27, 500	55, 000	.0050	0.	
30, 000	60, 000	.0055	0.	
30, 500	61, 000	.0055	....	
31, 000	62, 000	.0057	....	
31, 500	63, 000	.0058	....	
32, 000	64, 000	.0059	....	
32, 450	64, 900	....	....	Elastic limit. Load fell.
30, 500	61, 000	.0207	....	
31, 000	62, 000	.0221	....	
31, 500	63, 000	.0235	....	
32, 000	64, 000	.0253	....	
32, 500	65, 000	.0270	.0206	
33, 000	66, 000	.0283	....	
34, 000	68, 000	.0321	....	
35, 000	70, 000	.0370	.0298	
36, 000	72, 000	.0405	....	
37, 000	74, 000	.0451	....	
38, 000	76, 000	.0506	....	
39, 000	78, 000	.0571	....	
40, 000	80, 000	.0635	.0550	
44, 000	88, 000	.09	....	
46, 000	92, 000	.12	....	
47, 200	94, 400	....	....	Tensile strength.
0	0	.42	....	=10.5 per cent.

Diameter at fracture, ".57. Area, .255 square inch. Contraction, 49.0 per cent.

Appearance of fracture, fine silky. Cup-shaped end.

No. 2880.



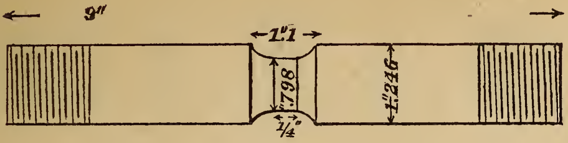
Marks, 8.
Diameter, ".798
Sectional area, .50 square inch.
Gauged length (covering stem and part of heads), 4".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	Initial load.
2, 500	5, 000	.0003	....	
5, 000	10, 000	.0007	....	
7, 500	15, 000	.0011	....	
10, 000	20, 000	.0015	....	
12, 500	25, 000	.0020	....	
15, 000	30, 000	.0023	0.	
17, 500	35, 000	.0028	....	
20, 000	40, 000	.0032	....	
22, 500	45, 000	.0037	....	
25, 000	50, 000	.0040	0.	
27, 500	55, 000	.0045	....	
30, 000	60, 000	.0049	....	
30, 500	61, 000	.0050	....	
31, 000	62, 000	.0051	....	
31, 500	63, 000	.0052	....	
32, 000	64, 000	.0053	....	
32, 500	65, 000	.0054	....	
32, 660	65, 320	....	....	Elastic limit. Load fell.
30, 500	61, 000	.0116	....	
31, 000	62, 000	.0126	....	
31, 500	63, 000	.0135	....	
32, 000	64, 000	.0145	....	
32, 500	65, 000	.0153	....	
33, 000	66, 000	.0164	....	
34, 000	68, 000	.0185	....	
35, 000	70, 000	.0207	.0146	
36, 000	72, 000	.0231	....	
37, 000	74, 000	.0258	....	
38, 000	76, 000	.0293	....	
39, 000	78, 000	.0323	....	
40, 000	80, 000	.0365	.0291	
Rested under zero load 15 hours.				
40, 000	80, 000	.0361	....	
40, 500	81, 000	.0363	....	
41, 000	82, 000	.0365	....	
41.500	83, 000	.0366	.0295	
42, 000	84, 000	.0369	....	
42, 500	85, 000	.0373	....	
43, 000	86, 000	.0471	....	
43, 500	87, 000	.0501	....	
44, 000	88, 000	.0537	....	
45, 000	90, 000	.0610	....	
46, 000	92, 000	.0705	....	
47, 000	94, 000	.0854	....	
48, 000	96, 000	.1069	....	
48, 900	97, 800	....	....	Tensile strength.
0	0	.30	....	= 7.5 per cent.

Diameter at fracture, ".60. Area, .283 square inch. Contraction, 43.4 per cent.

Appearance of fracture, fine silky. Cup-shaped end.

No. 2881.



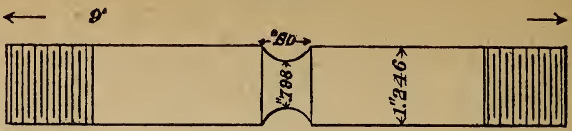
Marks, 8.
Diameter, ".798.
Sectional area, .50 square inch.
Gauged length (covering stem and part of heads), 4".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	Initial load.
2,500	5,000	.0003	....	
5,000	10,000	.0008	....	
10,000	20,000	.0015	....	
15,000	30,000	.0022	....	
20,000	40,000	.0031	.0001	
25,000	50,000	.0038	.0001	
27,500	55,000	.0041	....	
30,000	60,000	.0045	.0001	
30,500	61,000	.0046	....	
31,000	62,000	.0047	....	
31,500	63,000	.0048	....	
32,000	64,000	.0049	....	
32,500	65,000	.0049	....	
33,000	66,000	.0050	....	
33,500	67,000	.0051	.0001	
34,000	68,000	....	....	Elastic limit. Sustained momentarily, then load fell.
32,000	64,000	.0098	....	
32,500	65,000	.0102	....	
33,000	66,000	.0109	....	
33,500	67,000	.0116	....	
34,000	68,000	.0122	....	
34,500	69,000	.0130	....	
35,000	70,000	.0137	.0085	
36,000	72,000	.0152	....	
37,000	74,000	.0175	....	
38,000	76,000	.0190	....	
39,000	78,000	.0212	....	
40,000	80,000	.0240	.0175	
Rested under zero load 16 hours.				
40,000	80,000	.0238	....	
40,500	81,000	.0240	....	
41,000	82,000	.0241	....	
41,500	83,000	.0242	....	
42,000	84,000	.0243	.0177	
43,000	86,000	.0298	....	
44,000	88,000	.0347	....	
45,000	90,000	.0385	....	
46,000	92,000	.0431	....	
47,000	94,000	.0482	....	
48,000	96,000	.0561	....	
49,000	98,000	.0648	....	
50,000	100,000	.0798	....	
51,210	102,420	.14	....	Tensile strength.
0	0	.23	....	=5.7 per cent.

Diameter at fracture, ".62. Area, .302 square inch. Contraction, 39.6 per cent.

Appearance of fracture, fine silky. Cup-shaped ends. One-half of lip on each end.

No. 2882.



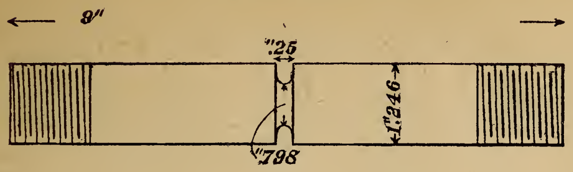
Marks, 8.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length (covering groove and part of heads), 4″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	Initial load.
5,000	10,000	.0007	....	
10,000	20,000	.0015	....	
15,000	30,000	.0021	....	
20,000	40,000	.0029	.0001	
25,000	50,000	.0035	....	
30,000	60,000	.0042	.0001	
30,500	61,000	.0043	....	
31,000	62,000	.0044	....	
31,500	63,000	.0045	....	
32,000	64,000	.0045	....	
32,500	65,000	.0046	....	
33,000	66,000	.0047	....	
33,500	67,000	.0048	.0002	
34,000	68,000	.0049	....	
34,500	69,000	.0050	....	
35,000	70,000	.0050	....	
35,500	71,000	.0052	....	
36,000	72,000	.0053	.0003	
36,000	72,000	.0053	....	
	72,000	.0053	....	After sustaining load 5 minutes.
36,500	73,000	.0054	....	
37,000	74,000	.0055	....	
37,500	75,000	.0057	....	
	75,000	.0059	.0007	After ½ minute.
37,500	75,000	.0060	....	
38,000	76,000	....	....	Sustained momentarily, then load fell.
37,000	74,000	.0092	....	
37,500	75,000	.0097	....	
38,000	76,000	.0101	....	
39,000	78,000	.0113	....	
40,000	80,000	.0127	.0068	
58,190	116,380	....	....	Tensile strength.
0	0	.18	....	=4.5 per cent.

Diameter at fracture, ″.66. Area, .342 square inch. Contraction, 31.6 per cent.

Appearance of fracture, fine silky. Cup-shaped end.

No. 2883.

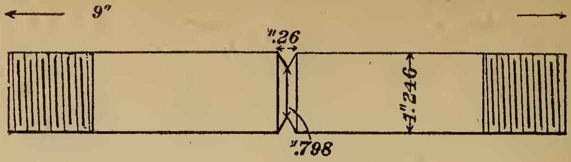


Marks, 8.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length (covering groove and part of heads), 4″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,000	1,000	0.	0.	Initial load.
10,000	20,000	.0013	....	
20,000	40,000	.0027	....	
30,000	60,000	.0040	.0002	
31,000	62,000	.0043	....	
32,000	64,000	.0044	....	
33,000	66,000	.0045	....	
34,000	68,000	.0047	....	
35,000	70,000	.0049	.0003	
36,000	72,000	.0050	....	
37,000	74,000	.0052	....	
38,000	76,000	.0053	....	
39,000	78,000	.0055	....	
40,000	80,000	.0057	.0004	
41,000	82,000	.0059	....	
41,500	83,000	.0061	....	
42,000	84,000	.0063	....	
42,500	85,000	.0065	....	
43,000	86,000	.0068	....	
44,000	88,000	.0073	....	
45,000	90,000	.0083	....	
46,000	92,000	.0093	....	
47,000	94,000	.0106	.0042	
67,480	134,960	....	....	Tensile strength.
0	0	.14	....	= 3.5 per cent.

Diameter at fracture, ″.70. Area, .385 square inch.
Contraction, 23.0 per cent.
Appearance of fracture, fine silky; seam across fractured surface.

No. 2884.



Marks, 8.
Diameter, ".798.
Sectional area, .50 square inch.
Gauged length (covering groove and part of heads), 4".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	Initial load.
5, 000	10, 000	.0005	....	
10, 000	20, 000	.0012	....	
15, 000	30, 000	.0018	....	
20, 000	40, 000	.0025	0.	
25, 000	50, 000	.0032	....	
30, 000	60, 000	.0039	....	
32, 500	65, 000	.0043	....	
35, 000	70, 000	.0046	.0001	
36, 000	72, 000	.0048	....	
37, 000	74, 000	.0049	....	
38, 000	76, 000	.0051	....	
39, 000	78, 000	.0053	....	
40, 000	80, 000	.0054	.0003	
41, 000	82, 000	.0057	....	
42, 000	84, 000	.0059	....	
43, 000	86, 000	.0062	.0007	
44, 000	88, 000	.0065	....	
45, 000	90, 000	.0068	....	
46, 000	92, 000	.0073	....	
47, 000	94, 000	.0079	....	
48, 000	96, 000	.0083	....	
49, 000	98, 000	.0089	....	
50, 000	100, 000	.0097	.0029	
58, 500	117, 000	....	....	Tensile strength.

Appearance of fracture, silky at the circumference 50 per cent., granular spot near the center 50 per cent.

Fractured surface contains a seam ".40 long.

CAST-IRON FROM FRAGMENTS OF RUPTURED 4.5-*INCH SIEGE GUNS, NOS.* 101 *AND* 102.

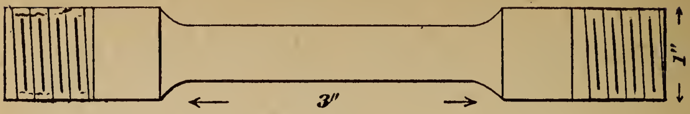
No. of test.	No. of gun.	How taken.	Diameter.	Sectional area.	Tensile strength per square inch.
			Inches.	*Sq. in.*	*Pounds.*
2493	101	Longitudinally	1.129	1.00	23,290
2494	101	.....do	1.129	1.00	22,980
2495	101	Radially	1.129	1.00	22,070
2496	101	..do	1.129	1.00	23,060
2497	101	Tangentially	1.129	1.00	23,990
2498	102	Longitudinally	1.129	1.00	24,480
2499	102	.....do	1.129	1.00	22,340
2500	102	Radially	1.129	1.00	22,350
2501	102	.....do	1.129	1.00	23,430
2502	102	Tangentially	1.129	1.00	22,990

CAST GUN-IRON.

Tenacity specimens from a slab furnished by the South Boston Iron Works. Alternate specimens tested at the Builders' Iron Foundry, Providence, R. I., for the purpose of comparing testing machines.

No. of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inch.	*Sq. in.*	*Pounds.*	*Pounds.*	
2771	T. M. 2.	.99	.77	24,910	32,350	Uniform granular.
2772	T. M. 4.	.99	.77	26,350	34,220	Do.
2773	T. M. 6.	.99	.77	23,700	30,780	Do.
2774	T. M. 8.	.99	.77	25,020	32,490	Do.

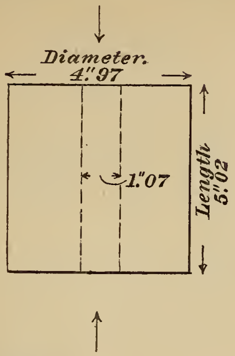
CAST-IRON FROM WATERTOWN ARSENAL FOUNDRY.



No. of test.	Marks.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	
2645	1–19	.564	.25	9,140	36,560	Fine granular.
2646	1–19	.564	.25	9,170	36,680	Do.
2647	1–19	.564	.25	9,040	36,160	Do.
2871	1	.505	.20	6,080	30,400	Do.
2872	2	.505	.20	5,590	27,950	Do.
	From 7″ shell.	.564	.25	8,390	33,560	Do.

Marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.
			Total.	Per square inch.	
	Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	
2–3.6	.505	.20	5,670	28,350	7.2362
3–3.6	.505	.20	5,910	29,550	7.2444
4–3.6	.505	.20	6,020	30,100	7.2459
5–3.6	.505	.20	6,190	30,950	7.2733
6–3.6	1.0092	.80	25,180	31,475	7.3188
6–3.6	.505	.20	6,510	32,550	7.2530
7–3.6	.505	.20	5,690	28,450	7.2568
8–3.6	.505	.20	5,940	29,700	7.2858
9–3.6	.505	.20	5,890	29,450	7.2606
10–3.6	.505	.20	6,160	30,800	7.2609
11–3.6	.505	.20	6,320	31,600	7.2775
12–3.6	.505	.20	6,170	30,850	7.2716
13–3.6	.505	.20	6,050	30,250	7.2754

COMPRESSION OF RUBBER SPRING USED FOR GUN-CARRIAGE BUFFERS.



Weight, 6 pounds 11½ ounces.

Applied loads.	Length.	Compression.	Successive compression.	Middle diameter.	Remarks.
Pounds.	*Inches.*	*Inches.*	*Inch.*	*Inches.*	
200	4.98	0.	0.	5.01	Initial load.
400	4.96	.02	.02	5.03	
600	4.90	.08	.06	5.06	
800	4.86	.12	.04	5.08	
1,000	4.80	.18	.06	5.10	
2,000	4.58	.40	.22	5.24	
3,000	4.34	.64	.24	5.40	
4,000	4.08	.90	.26	5.58	
5,000	3.90	1.08	.18	5.73	
6,000	3.72	1.26	.18	5.90	
7,000	3.55	1.43	.17	6.07	
8,000	3.39	1.59	.16	6.20	
9,000	3.23	1.75	.16	6.36	
10,000	3.10	1.88	.13	6.50	
9,000	3.11	1.87	— .01	6.48	
8,000	3.13	1.85	— .02	6.46	
7,000	3.18	1.80	— .05	6.41	
6,000	3.26	1.72	— .08	6.34	
5,000	3.37	1.61	— .11	6.23	
4,000	3.56	1.42	— .19	6.07	
3,000	3.82	1.16	— .26	5.86	
2,000	4.16	.82	— .34	5.55	
1,000	4.53	.45	— .37	5.29	
200	4.80	.18	— .27	5.12	
1,000	4.63	.35	+ .17	....	
2,000	4.36	.62	.27	....	
3,000	4.08	.90	.28	....	
4,000	3.81	1.17	.27	....	
5,000	3.59	1.39	.22	....	
6,000	3.41	1.57	.18	....	
7,000	3.26	1.72	.15	....	
8,000	3.15	1.83	.21	....	
9,000	3.05	1.93	.10	....	
10,000	2.98	2.00	.07	....	
11,000	2.88	2.10	.10	6.74	Rested 20 minutes.
12,000	2.79	2.19	.09	6.84	
13,000	2.73	2.25	.06	6.92	
14,000	2.68	2.30	.05	7.00	
15,000	2.61	2.37	.07	7.08	
16,000	2.57	2.41	.04	7.15	Rested 2 hours.
17,000	2.45	2.53	.12	7.28	
18,000	2.42	2.56	.03	7.33	
19,000	2.37	2.61	.05	7.38	
20,000	2.32	2.66	.05	7.47	
19,000	2.32	2.66	0.	7.47	
18,000	2.32	2.66	0.	7.47	
17,000	2.33	2.65	— .01	....	
16,000	2.34	2.64	— .01	....	
15,000	2.35	2.63	— .01	....	
14,000	2.37	2.61	— .02	....	

COMPRESSION OF RUBBER SPRING, ETC.—Continued.

Applied loads.	Length.	Compression.	Successive compression.	Middle diameter.	Remarks.
Pounds.	*Inches.*	*Inches.*	*Inch.*	*Inches.*	
13, 000	2. 39	2. 59	—. 02	....	
12, 000	2. 41	2. 57	—. 02	....	
11, 000	2. 43	2. 55	—. 02	....	
10, 000	2. 46	2. 52	—. 03	7. 29	
9. 000	2. 49	2. 49	—. 03	....	
8, 000	2. 53	2. 45	—. 04	....	
7, 000	2. 60	2. 38	—. 07	....	
6, 000	2. 69	2. 29	—. 09	....	
5, 000	2. 79	2. 19	—. 10	6. 88	
4, 000	3. 60	1. 98	—. 21	....	
3, 000	3. 31	1. 67	—. 31	....	
2, 000	3. 78	1. 20	—. 47	....	
1, 000	4. 25	. 73	—. 47	....	
200	4. 57	. 41	. 32	....	
0	Mean. 4. 67	. 31	. 10	5. 24	End diameters, 4″.90, 4″.88.

Ends concave about ″.08 and ″.06.
Diameter of hole at ends, 1″.03 each end.
Under 20,000 pounds surface cracks were started.

TENSILE TEST OF SPLICED SAMPLE OF GUTTA-PERCHA-COVERED COPPER TELEGRAPH CABLE CORE FOR THE CHIEF SIGNAL OFFICER, U. S. ARMY.

No. 2620.

Sample is composed of seven copper wires of about ″.027 diameter each.

Outside diameter of gutta-percha covering, ″.275.

At the splice outside diameter is ″.360.

Tensile strength, 192 pounds.

Parted at the splice.

TESTS OF SINGLE WIRES.

No. of test.	Tensile strength.	Location of fracture.
	Pounds.	
2621	32	At the grips.
2622	31	Near the middle of length.
2623	27	Do.
2624	26	Do.

LIST OF TESTS MADE FOR PRIVATE PARTIES DURING FISCAL YEAR ENDING JUNE 30, 1889.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1888.				
July 9	Cast-iron	E. D. Leavitt, jr	Cambridgeport	Mass.
16	Steel plate	Whittier Machine Co	South Boston	Mass.
17	Chain cable	Bradlee & Co	Philadelphia	Pa.
21	Wrought-iron plate	P. M. Blake	Hyde Park	Mass.
21	Cast-iron	C. L. Pierson & Co	Boston	Mass.
21	Bronze	South Boston Iron Works	South Boston	Mass.
28	Cast-iron	E. P. Cutler & Co	Boston	Mass.
Aug. 13	....do	John Souther & Co	....do	Mass.
15	Percha iron	J. C. Warr & Co	South Boston	Mass.
15	Cast iron	Golding & Co	Boston	Mass.
15	Concrete	N. W. Godfrey	Port Eaton	L. I.
20	Marble	St. Lawrence Marble Co	Gouverneur	N. Y.
27	Brick pier	Prof. L. M. Norton	Boston	Mass.
29	Sandstone	Norcross Bros	....do	Mass.
Sept. 5	Chain cable	Bradlee & Co	Philadelphia	Pa.
6	Steel plate	Sullivan & Ehlers	Albany	N. Y.
6	Wrought-iron rods	S. B. Cushing & Co	Providence	R. I.
8	Steel plate	E. D. Leavitt, jr	Cambridgeport	Mass.
10	Bluestone	Prof. L. M. Norton	Boston	Mass.
20	Brake beams	Marden Car Brake Co	....do	Mass.
21	Deoxidized bronze	Deoxidized Metal Co	Bridgeport	Conn.
Oct. 1	Electrically welded bars	Thomson Electric Welding Co.	Boston	Mass.
2	Steel plate	Hartford Steam Boiler I. and Ins. Co.	....do	Mass.
9	Hydraulic gauge	Star Brass Manufacturing Co.	....do	Mass.
13	Cast-iron	J. B. & J. M. Cornell	New York	N. Y.
24	Hydraulic gauges	Star Brass Manufacturing Co.	Boston	Mass.
24	Anchors for building joints	Henry A. Goetz	New Albany	Ind.
30	Bluestone	J. R. Ashe	Yorkville	S. C.
30	Rolled steel and iron	Providence Cylinder Co	Providence	R. I.
30	Steel plate	New York and New England Railroad Co	Boston	Mass.
31	Chain cable	Bradlee & Co	Philadelphia	Pa.
Nov. 3	Riveted chain	J. Souther & Co	Boston	Mass.
19	Steel plate	I. P. Morris Co	Philadelphia	Pa.
20	Terra-cotta lumber	New England Terra Cotta Lumber Co.	Boston	Mass.
21	Electrically welded wire cables.	Thomson Electric Welding Co.	....do	Mass.

LIST OF TESTS MADE FOR PRIVATE PARTIES, ETC.—Continued.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1888. Dec. 10	Riveted joints	New York and New England Railroad Co.	Norwood	Mass.
10	Wrought-iron plate	George H. Lloyd	Boston	Mass.
22	Steel plate	Cunningham Iron Co	do	Mass.
29	Sandstone	M. E. Maher	Atlanta	Ga.
31	Tin, lead, and solder	W. L. Haines	Providence	R. I.
1889. Jan. 4	Steel plate	I. P. Morris Co	Philadelphia	Pa.
4	do	Cunningham Iron Co	Boston	Mass.
8	Cast-iron	Worswick Manufacturing Co.	Cleveland	Ohio.
16	Elastic composition	Overlack Elastic Comp. Co.	Boston	Mass.
16	Steel plate	F. A. Houdlette & Co	do	Mass.
18	Sandstone	Chattanooga Marble and Stone Co.	Chattanooga	Tenn.
19	Steel plate	I. P. Morris Co	Philadelphia	Pa.
22	Eye-bars	Central Railroad and Banking Co.	Savannah	Ga.
22	Granite	Peabody & Stearns	Boston	Mass.
24	Wrought-iron plate	Boston Bridge Works	do	Mass.
24	Steel plate	Wm. Allen & Sons	Worcester	Mass.
24	Cast-iron	I. P. Morris Co	Philadelphia	Pa.
24	Chain cable	New Jersey Steel and Iron Co	Trenton	N. J.
28	Pressure gauge	Star Brass Manufacturing Co.	Boston	Mass.
Feb. 16	Cast-iron	Wm. J. Young	Lynn	Mass.
18	do	Geo. L. Fowler	New York	N. Y.
18	do	Edmund Grinnell	New Bedford	Mass.
18	Steel plate	Wm. Allen & Sons	Worcester	Mass.
18	do	Geo. H. Lloyd	Boston	Mass.
20	Wrought-iron plate	Boston Bridge Works	do	Mass.
20	Sandstone	A. B. Mullett & Co	Washington	D. C.
20	Eye-bars	Central R. R. & Banking Co.	Savannah	Ga.
25	Car-truck bolster and links	Harrison Loring	South Boston	Mass.
26	Wrought-iron plate	Boston Bridge Works	Boston	Mass.
Mar. 12	Wrought-iron plate and bars.	do	do	Mass.
13	Steel plate	I. P. Morris Co	Philadelphia	Pa.
13	Bricks	Potomac Terra Cotta Co	Washington	D. C.
13	Freestone	Buena Vista Freestone Co.	Buena Vista	Ohio.
14	Wrought-iron plate	Boston Bridge Works	Boston	Mass.
14	Bronze	Deoxidized Metal Co	Bridgeport	Conn.
29	Chain cable	Bradlee & Co	Philadelphia	Pa.
30	Marble	James Hitchcock	Chicago	Ill.
Apr. 8	Cement	do	do	Ill.
8	Hoop-iron buckles	John M. Larkin	Memphis	Tenn.
8	Steel plate	Salem Electric Lighting Co.	Salem	Mass.
8	Block, link, and hooks	W. H. Hammond	Boston	Mass.
8	Wrought-iron plate	Boston Bridge Works	do	Mass.
9	Steel plate	Geo. H. Lloyd	do	Mass.
9	do	F. A. Houdlette & Co	do	Mass.
9	Hydraulic gauge	American Steam Gauge Co.	do	Mass.
9	Cast-iron	N. S. Bartlett & Co	do	Mass.
10	Stay-bolts	James Russell & Sons	South Boston	Mass.
10	Wrought-iron plate	Boston Bridge Works	Boston	Mass.
10	Cast-iron	I. P. Morris Co.	Philadelphia	Pa.
15	Wrought-iron plate	Boston Bridge Works	Boston	Mass.
16	Sandstone	Norcross Bros	do	Mass.
17	Wrought-iron bars	Boston and Maine R. R. Co.	do	Mass.
17	Steel bars	American Steel Car Wheel Co.	do	Mass.
27	Steel wire belt	Emerson & Midgley	Beaver Falls	Pa.
27	Steel plate	Whittier Machine Co	Roxbury	Mass.
27	Chain cable	Bradlee & Co	Philadelphia	Pa.
29	Brake beam	Marden Car Brake Co	Boston	Mass.
29	Paving bricks	H. Gore & Co	do	Mass.
May 1	Bricks	Southwestern Brick and Terra Cotta Co.	Kansas City	Mo.
1	Wrought-iron plate	Boston Bridge Works	Boston	Mass.
6	Steel plate	Cunningham Iron Co	do	Mass.
9	Steel casting	Golding & Co	do	Mass.
11	Chain cable	P. Hayden Saddlery Hardware Co.	Columbus	Ohio.
16	Riveted chain	Holmes & Blanchard	Boston	Mass.

LIST OF TESTS MADE FOR PRIVATE PARTIES, ETC.—Continued.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1889. May 17	Electrically welded wire cable.	Thomson Electric Welding Co.	Boston	Mass.
18	Cordage	Plymouth Cordage Co	Plymouth	Mass.
	Chain cable	Bradlee & Co	Philadelphia	Pa.
22	Electrically welded wire cable.	Thomson Electric Welding Co.	Boston	Mass.
27	Chain cable	Bradlee & Co	Philadelphia	Pa.
	Steel plate	F. A. Houdlette & Co	Boston	Mass.
31	Chain cable	Bradlee & Co	Philadelphia	Pa.
	Wrought iron bolts	H. P. Oakman	Neponset	Mass.
June 1	Cordage	Plymouth Cordage Co	Plymouth	Mass.
	Railroad truck bolster and steel plate.	Harrison Loring	South Boston	Mass.
3	Wrought-iron plate	Boston Bridge Works	Boston	Mass.
4	Steel plate	I. P. Morris Co	Philadelphia	Pa.
6	Cement briquetts	James Hitchcock	Chicago	Ill.
12	Chain cable	Bradlee & Co	Philadelphia	Pa.
	Spirally wound tubes	Pneumatic Dynamite Gun Co.	New York	N. Y.
14	Car truck bolster and steel plate.	Harrison Loring	South Boston	Mass.
15	Wrought-iron plate	P. M. Blake	Hyde Park	Mass.
19	Cordage	Prof. J. E. Denton	Hoboken	N. J.
	Hard-pine posts	Lynchburg Cotton Mill and Improvement Co.	Lynchburg	Va.
22	Steel plate	E. P. Boggs	Cambridgeport	Mass.
	Wrought-iron tubes	Pneumatic Dynamite Gun Co.	New York	N. Y.

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